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ABSTRACT

Five reflective and five impulsive fourth-grade boys were identified in a group of 56 fourth graders given the Matching Familiar Figures Test. The Reading Miscue Inventory was used to analyze the oral reading miscues of these pupils while reading a story of fifth-grade difficulty. Analysis of results indicated a trend toward significant differences between the two groups in the areas of semantic acceptability and grammatical relationships. No differences were found in the number of miscues, in comprehension pattern, or in comprehending. Other indications of differences between reflective and impulsive readers are discussed, and suggestions for further research are made. (Author/AA)

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REFLECTION-IMPULSIVITY AND ORAL READING MISCUES AMONG FOURTH-GRADE BOYS

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AN ABSTRACT OF A THESIS

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

RUTGERS

THE STATE UNIVERSITY OF NEW JERSEY

BY

PENNIE ALICE WALTZ

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

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ABSTRACT

This study examined the effects of a disposition toward reflection or impulsivity on the oral reading process. Fifty-six fourth-grade children were given the Matching Familiar Figures Test by Jerome Kagan. Using one standard deviation above and below the mean, eight boys were identified at each extreme of response time. Five reflective boys and six impulsive boys were finally selected based on response time and errors. Reflectives were above the median in response time and below the median in errors. Impulsives were below the median in response time and above the median in errors.

The Reading Miscue Inventory by Goodman and Burke was used to analyze the oral reading miscues these students generated while reading a story of fifth-grade difficulty.

Two null hypotheses were tested: A disposition toward reflection or impulsivity does not affect oral reading miscues, and a disposition toward reflection or impulsivity does not affect reading comprehension. The findings support neither acceptance nor rejection of the null hypotheses. Trends were identified indicating differences between the two groups in both oral reading miscues and comprehension. Statistical analysis of the results in selected areas indicated a trend toward significant differences between the two groups in the areas of semantic acceptability and grammatical relationships. The results

approach but are not significant at the .05 level. No significant differences were found in the number of miscues, comprehension pattern, and comprehending. The most consistent findings were that the scores in the nine categories of the RMI for R and I students overlapped and scores for I students were lower and wider in range.

It should be noted that there was little difference between mean scores of the two groups in the areas of graphic similarity, sound similarity, grammatical function, correction, and grammatical acceptability. There was a difference of 15 or more points in the mean scores in the areas of semantic acceptability, meaning change, comprehension pattern, comprehending, and grammatical relationships pattern with the reflective group having the higher scores. Based on these findings, it appears that response uncertainty is more of a factor in the area of comprehension than it is in the areas of graphic, phonemic, and grammatical skills.

While strong statistical support is lacking, the findings of this study indicate other trends toward differences between reflective and impulsive readers. Reflective readers were more likely to correct miscues which did not retain the grammatical function, indicating a strong recognition of structural anomaly. They tended to have a greater concern for accuracy as evidenced by their slightly higher rate of correction, greater correction of miscues which involved a minimal change of meaning, and greater

involvement in overcorrection.

The trends identified in this study indicate a need for further investigation of the relationship between reflection-impulsivity and oral reading. Further investigation should explore the areas of reading and stability of response style, training in visual discrimination, and reading for different purposes, i.e., directions, questions, stories.

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CHAPTER I

INTRODUCTION

Background of the Study

Researchers have analyzed oral reading errors in a variety of ways. While these analyses differ considerably, they may be viewed as belonging to one of two groups (Weber, 1968). The researchers in one group have been concerned primarily with evaluating reading skill and diagnosing weaknesses (e.g., Madden & Pratt, 1941; McCullough et al., 1946; Monroe, 1928). They have used the analysis of errors to identify a base for remedial instruction and to establish norms. This group has generally viewed oral reading errors in a negative sense as failures to read accurately and a mark of the unsuccessful reader.

Another group of researchers has not been concerned with the errors of disabled readers but rather with those made by successful readers (e.g., Clay, 1968; Goodman, 1965; Weber, 1970). These researchers have sought to identify those aspects of an erroneous response which may be correct and the strategies which readers use to derive meaning from print.

In her summary of classification systems of oral reading errors, Weber (1968) noted a number of deficiencies.

These included overlapping categories; confusions over the function of oral reading, resulting in concern with extraneous phenomena (poor enunciation, hesitation, inadequate phrasing, posture); lack of recognition of language differences due to dialect; and a lack of concern for the linguistic function of errors. In his taxonomy of oral reading cues and miscues, Goodman (1969) overcomes these deficiencies and yet another deficiency; that is, the lack of a theoretical base. He contends that many of the systems for classifying oral reading errors are of limited value because they are atheoretical. Goodman has developed a theory and taxonomy for analyzing oral reading errors which are based on psycholinguistic theory. He asserts that an understanding of the reading process depends on "understanding how language and thought are interrelated. Psycholinguistics is the study of these relationships" (Goodman, 1969, p. 11).

The Goodman model has been developed and refined in the last 10 years. The model is based on "the premise that all responses to the graphic display are caused and are not accidental or capricious" (Goodman, 1969, p. 12). Goodman labels deviations from the graphic display "miscues" to indicate that they are not random responses, but are cued by the thought and language of the reader in his meeting with written material (Goodman, 1973). The logic of Goodman's system develops from a consideration of the meaning of miscues for the reader. Responses which correspond to

the expected response do not show the process by which they were produced. However, observed responses (OR's), those that differ from expected responses (ER's), are generated by the same process as expected ones. Therefore, Goodman reasons that a comparison of observed responses and expected responses may provide insights into how the reading process is functioning in a given reader (1969).

With his associate, Carolyn Burke, Goodman (Goodman & Burke, 1968) has developed and refined (Burke, 1969) a taxonomy in which miscues are analyzed in terms of their psycholinguistic relationship to the text. A complete outline of the Goodman Taxonomy of Reading Miscues may be found in Goodman's (1973) latest study. The taxonomy includes 18 major categories: Correction, dialect, graphic proximity, phonemic proximity, allologs, syntactic acceptability, semantic acceptability, transformation, syntactic change, semantic change, intonation, five levels of structural involvement from submorphic to clause, grammatical category, and surface structure of observed response and OR in visual periphery.

According to Goodman (1969, 1973) and other researchers (Goodman & Burke, 1969; Menosky & Goodman, 1971) reading is not an exact process of letter or word recognition. Instead, the process consists of prediction, selection, sampling, confirming and/or correction of cues. In this process, the reader uses three basic kinds of information: Graphophonic, syntactic, and semantic. Data

gathered using the Taxonomy may be analyzed in relation to these three kinds of information or cueing systems.

One purpose of the Reading Miscue Inventory developed by Y. Goodman and C. Burke (1972) was to provide a means for applying reading miscue research information to the classroom. Another purpose was to enable teachers to gain insight into the reading process; insight which might lead to beneficial changes in reading curriculum and methods. The RMI is a modification of Goodman's Taxonomy of Reading Miscues (1965, 1973). Instead of 18 major categories, there are 9. They are dialect, intonation, graphic similarity, sound similarity, grammatical function, correction, grammatical acceptability, semantic acceptability, and meaning change. By interrelating selected items, patterns are identified which give insight into the reader's use of cueing systems and correction strategies. The RMI has stimulated a number of basic research studies. The studies of Brody (1973), Burke (1973), Hoffner (1974), Watson (1973), and Young (1972) are reviewed in Chapter II.

Researchers have investigated Goodman's model in relation to a number of variables. These include age, reading ability, oral and written language, bilingualism, conceptual knowledge, and dialect (Allen, 1969; C. Burke, 1969; Carlson, 1970; Y. Goodman, 1967; K. Goodman & C. Burke, 1968; Gutknecht, 1971; Martellock, 1971; Menosky, 1971; Page, 1970; Romatowski, 1972; Rousch, 1972; Sims,

1972; and Thornton, 1973). In this study, the relationship between oral reading miscues and a cognitive style dimension will be investigated.

In his discussion entitled "The Psycholinguistic Nature of the Reading Process," Goodman writes that the reader

> . . . must actively bring to bear his knowledge of language, his past experience, his conceptual attainments on the processing of language information encoded in the form of graphic symbols in order to decode the written language. (1968, p. 15)

He views reading as an interaction between the reader and written language. Through this interaction, the reader attempts to derive meaning from the writer. Thus, in a psycholinguistically based study, consideration of the reading process must also consider the reader.

In the following study, the reader will be studied in terms of the construct named reflection-impulsivity (R-I) (Kagan, 1965c). This construct is also referred to in the literature as conceptual tempo and is a cognitive style dimension. It grew out of Kagan's early work on the analytic-inferential-relational dimensions of cognitive style (Kagan, Rosman, Day, Albert, & Phillips, 1964):

> This disposition is defined as the tendency to reflect over alternative-solution possibilities, in contrast with the tendency to make an impulsive selection of a solution in problems with high response uncertainty. (Kagan, 1965c, p. 609)

Studies of conceptual tempo have shown that it affects performance; specifically problem solving behavior, discrimination tasks, visual perception, recognition memory, paired

associate learning, and inductive reasoning and deductive reasoning (Albert, 1970; Ault, 1973; Berzonsky & Ondrako, 1974; Drake, 1970; Fancher, 1970; Finney, 1970; Gozali, 1969; Hemry, 1973; Kagan, 1965b; Kagan, Pearson, & Welch, 1966a; Milgram, 1970; Rhetts, 1970; Siegel, Kirasic, & Kilburg, 1973). Other areas found to be related to conceptual tempo are verbal control of motor behavior, cardiac rates, and focusing behavior (Kagan & Rosman, 1964; Meichenbaum & Goodman, 1969; Nuessle, 1972).

Statement of the Problem

The goals of this study are both qualitative and quantitative. One goal is to describe what effects a disposition toward reflection or impulsivity has on the oral reading process. Another goal is to measure the difference between reflective (R) and impulsive (I) students in relation to selected oral reading variables. They are comprehension (grade level on the California Achievement Test), comprehension pattern, semantic acceptability, comprehending, and grammatical relationships.

The following null hypotheses were tested:

1. A disposition toward reflection or impulsivity does not affect oral reading miscues.

A. A disposition toward reflection or impulsivity does not affect semantically acceptable miscues.

B. A disposition toward reflection or impulsivity does not affect cueing systems, specifically the

comprehension pattern and grammatical relationships pattern.

2. A disposition toward reflection or impulsivity does not affect reading comprehension.

Importance of the Study

The relationship between R-I and reading has not been widely researched. Two key studies are Kagan's (1965c) study entitled, "Reflection-Impulsivity and Reading Ability in Primary Grade Children," and Douglas R. Denney's (1974) study entitled, "The Relationship of Three Cognitive Style Dimensions to Elementary Reading Ability."

The design of the present study differs in a number of ways from Kagan's. A major difference is that Kagan did not base his analysis on psycholinguistic theory. He did not analyze the grammatical function of errors nor did he attempt to identify cueing systems. His results are stated in terms of error type. Another difference is that he did not evaluate comprehension.

The present study also differs from Denney's (1974). Denney studied three cognitive style dimensions, one of them being conceptual tempo. He does not psycholinguistically analyze oral reading errors. He related results on the Gilmore Oral Reading Test to R-I.

A number of unpublished doctoral dissertations have investigated the relationship between reading and R-I (Butler, 1972; Kalash, 1972; King, 1972; and Lesiak, 1970).

Butler's study is especially pertinent since in this study, selected components of the Goodman Taxonomy of Reading Miscues were studied in relation to R-I. The findings of these studies have been mixed. Researchers have found differences in reading performance between R and I students in the primary grades (Butler, 1972; Kalash, 1972; and Lesiak, 1970). In contrast, King (1972) found that grouping children according to R-I and providing teachers who were knowledgeable of the R-I dimension did not affect the reading progress of the children studied.

The potential effects of R-I on the learning situation and reading in particular are great. Coop and Sigel (1971) discuss the possible effects on student performance of mismatches between the conceptual tempos of the teacher and the student. Their observations are relevant to reading. For example, they suggest that the numerous speed drills and games that call for rapid information processing may disadvantage the reflective learner. Conversely, the impulsive student may become bored in a classroom situation designed to promote the learning of the reflective student. Coop and Sigel conclude their discussion on cognitive style with the observation that "In effect, the research on cognitive style suggests that there is tremendous variability in the way in which individuals process information and hence in the manner in which they approach individualized instructional programs" (1971, p. 160). Since many teachers today use individualized instructional

programs in their classrooms, a further investigation of the different cognitive styles of students would seem to be valuable.

Reading is a cognitive task so it seems reasonable to hypothesize that there will be a relationship between a cognitive style dimension and oral reading. Goodman and Burke (1969) view reading as a complex language and psychological phenomena in which the reader's cognitive processes, language, and the physical format of the material interact.

The goals of this study were to determine the degree of association between R-I and oral reading miscues and to learn more about the nature of these variables. Using Goodman and Burke's (1972) Reading Miscue Inventory, another goal of this study was to provide further support for Goodman's theory by testing its validity with readers who have different conceptual tempos.

Definition of Terms

Cues.--Signals which the reader uses to derive meaning from printed material. These are found within words, in the flow of language, within the reader, and external to both language and the reader.

Miscues.--Deviations in oral reading from printed material; that is, each instance where a reader's observed response (OR) differs from the expected response (ER).

Reflection.--A disposition which is defined as the tendency to reflect over alternative-solution possibilities,

in problems with high response uncertainty (Kagan, 1965c).

Impulsivity.--A disposition to make an impulsive selection of a solution in problems with high response uncertainty (Kagan, 1965c).

Response latency.--The time between presentation of the problem and the child's initial offering of an answer.

Conceptual tempo.--"The tendency to respond in a reflective vs. an impulsive manner when given a chance to choose among very similar stimulus alternatives" (Coop & Sigel, 1971, p. 153).

Cognitive style.--A term that refers to "stable individual preferences in the mode of perceptual organization and conceptual categorization of the external environment. . . ." (Kagan, Moss, & Sigel, 1963, p. 74).

Limitations of the Study

A major limitation of this study was the methodology inherent in Goodman and Burke's (1972) Reading Miscue Inventory. Due to the detailed analysis involved, a small number of subjects was included. This was necessarily a descriptive study not a statistical one. True randomization of subjects was not possible nor intended. Since students were selected on the basis of response time and errors, they were not reading on the same level, as measured by a silent standardized reading test.

The original pool of subjects from which the R and I students were chosen was relatively small. While there

were 77 fourth-grade students in the school, not all of these students were given the MFF due to a lack of parental permission.

In regard to R-I, it should be noted that they are not dichotomous behavioral patterns. Reflection and impulsivity represent two ends of a continuum. Any one person may be judged more or less impulsive relative to other people. By definition, a judgment of reflection or impulsivity applies to a person's behavior in problems with high response uncertainty. Since the RMI is administered using material written on a level one year above the student's reading level, it was assumed that a judgment of reflection or impulsivity would apply in that reading situation. It should not be assumed that the relationships found here apply in all reading situations.

CHAPTER II

REVIEW OF THE LITERATURE

The focus of this review will be two areas of research: Linguistically based studies of oral reading, particularly studies based on the Goodman model, and studies of R-I. In a third section, studies of the relationships between the dimension of R-I and reading will be reviewed. The purpose of this review is to consider the contributions of linguistic studies of oral reading to knowledge of the reading process. And to explore in depth the findings of studies of R-I so that the importance of this dimension to education and reading, in particular, may be considered.

Forerunners of Linguistic Studies

M. S. Burke (1973) identifies a number of studies which she contends are forerunners of the linguistic oral reading studies. In contrast to Weber (1968) who concluded that few of the earlier studies considered the various levels of linguistic structure in their classification of oral reading errors, Burke suggests that the conclusions of several studies are pertinent to linguistic analyses. She cites Payne (1930), Bennett (1942), Swanson (1937),

Fairbanks (1937), Madden and Pratt (1941), and MacKinnon (1959). There is an indication as early as Payne's study that the classification of one particular type of error in a child's reading is secondary to the analysis of the larger context of the total reading process. She asserts that whether there is a

> . . . reversal, omission, insertion, or substitution of letters in the child's attempt to pronounce an unknown word is mere chance circumstance and depends among other factors on the degree of similarity between the word presented and the words being learned at the same time. (Payne, 1930, p. 146)

Linguistically Based Studies of Oral Reading

Notable among the findings of linguistic studies of oral reading is the important role of grammatical structure. Biemiller (1971) identifies three main phases of development. The first phase, named pre-nonresponse, is characterized by the predominant use of contextual information. In the second phase, nonresponse, there is a predominance of nonresponse errors and a significant increase of graphically constrained errors. In the third phase, there is an increase in the co-occurrence of graphic and contextual constraints. In this phase, the increases in the efficiency of letter feature identification and the use of structural relationships between letters were found to be associated with increased speed of word perception compared to children in the other two phases.

MacKinnon (1959) identified three similarly defined

phases: Contextually constrained errors, nonresponse errors, and graphic substitutions. However, he provided no quantitative data and no analysis of children of differing abilities.

Like Biemiller (1971), Weber (1970) also investigated the role of syntactic constraints. She concludes, based on judgments of grammatical acceptability and parts of speech analysis of oral reading samples, that both strong and weak readers brought their knowledge of linguistic structure to bear on the identification of words. She contends that children expected the sentences read to conform to the structure of language as they read. The semantic appropriateness of errors also indicated that children were expecting meaningful language in their reading. Of those errors judged for semantic appropriateness, all of which were grammatically acceptable, 92.8% were found to be consistent with the meaning of the rest of the sentence. In fact, Weber found almost complete overlap between semantic and syntactic appropriateness. This finding is supported in the studies of Y. Goodman (1967) and Kolers (1970).

Clay (1968) also explored the importance of syntactical rules of grammar in the reader's selection of a response. In an analysis of the self-correction patterns of five-year-old children reading orally, she provides evidence for the contribution of structural cues. She notes the high incidence of syntactic equivalence between error

substitutions and the textual stimulus.

In her study of oral reading errors and reading comprehension, Nurss (1969) studied levels of structural depth using Allen's (1964) sector analysis. Structural depth is a complexity measure defined as the maximum number of levels required to go from sentence to word level. Studying second-grade children reading sentences of varying levels of syntactic complexity, Nurss found that errors in sentences of low structural depth more frequently made sense than those in sentences of high structural depth. Sentences of high structural depth produced more oral errors. She concludes that the syntactic complexity of sentences being read is related to the number of oral reading errors which a child is likely to make.

Grapheme similarity has also been investigated in linguistic studies. Weber (1970) reports that the means of graphic similarity showed that better readers more closely approximated the correct response than weaker readers. Both groups of first-grade students showed improvement in the use of sound-letter patterns as the year progressed.

Both Biemiller's (1971) and Weber's (1968) studies provide support for the view that differences in first-grade abilities are evident primarily in the handling of graphic information. These studies offer support for Weber's (1970) statement that "Learning the optimal balance in the use of graphic information and of structural constraints may in fact be one of the main tasks for the

novice reader" (p. 443).

The linguistically based studies cited provide evidence for the importance of syntactic acceptability and to a lesser degree grapheme correspondence in the oral reading process.

Origin of the Taxonomy

The origin of the Goodman Taxonomy of Reading Miscues may be traced to a linguistic study of cues and miscues in oral reading which K. S. Goodman conducted in 1965. The subjects were 100 children in grades 1, 2, and 3. Goodman compared the children's ability to read lists of words to their ability to read stories containing those same words. Two major findings were that children were able to read many words in context which they could not read from lists and virtually every regression was made for the purpose of correcting previous reading. Goodman classified all of the errors or miscues of these students. This led to the "Preliminary Linguistic Taxonomy of Cues and Miscues in Reading." Since 1965, the Taxonomy has been modified a number of times. The present version is detailed in K. S. Goodman's (1973) study, which is discussed later.

Studies Based on the Goodman Model

As noted in the introduction, researchers have investigated Goodman's model in relation to a number of variables. First, the specific contributions of selected

studies to four basic areas of information about oral reading will be discussed. The areas are: Miscues, graphic and phonemic proximity, syntactic and semantic information, and corrections. Selected studies in which researchers manipulated variables external to the reader and within the reader will be discussed later.

Contrary to the results of studies by Burke (1969), Allen (1969), and Y. Goodman (1971), Goodman and Burke (1968) found a negative correlation between miscues per 100 words and comprehension. It should be noted that this was a study of proficient readers and the results may not generalize to average and poor readers.

Y. Goodman (1971) in a longitudinal study of oral reading behavior of four Negro children identifies differences between miscue patterns of slow and average readers during their second and third year of reading instruction. Among both groups, she found that miscues per 100 words varied from child to child and from reading to reading for any one reader. She concludes that quantitative phenomena show no simple developmental decrease or increase of miscues per 100 words (MPHW) and so by themselves do not indicate a pattern of developing reading proficiency. MPHW did not predict comprehension. The major difference between average and slow readers was not in the use of strategies but in the ability to use strategies effectively. Strategies and developmental trends identified by Goodman are discussed in the next section.

Menosky (1971) reports on the quality and quantity of miscues in varying portions and lengths of text. The number of miscues was found to increase with the length of the selection. She also found that miscues change qualitatively as readers progress through the text if the passage is long enough for them to gain contextual support. All readers were found to rely somewhat upon the preceding material when attacking meaning and to show anticipation of coming material.

As reported in other studies, K. S. Goodman and C. Burke (1969) report that graphic proximity of miscues is greater than phonemic proximity and there is a strong tendency for grammatical function to be retained in the miscue.

In their conclusions about syntactic information, Goodman and Burke (1968) conclude that the grammatical function of the stimulus does affect the grammatical function of the response. Burke and Goodman (1970) found that the percent of occurrence for each grammatical function involved in miscues was close to the percent of their occurrence in the text. The grammatical function of the stimulus also influences the miscue type. Substitutions with insertions or omissions occur most frequently for verbs, nouns, and function words. Totally acceptable miscues are more likely to involve syntactic change than semantic change.

In order of frequency of occurrence, most miscues

were found to involve a high percentage of intonational acceptability, syntactic acceptability, and semantic acceptability (Goodman & Burke, 1970).

In a study of grammatical retransformations, K. S. Goodman and C. Burke (1969) divided oral reading miscues into those which did not change syntactic structure (nontransformation miscues) and those which did (retransformation miscues). They found different cueing patterns at work in nontransformation miscues and retransformation miscues. There was a strong tendency toward high graphic proximity in nontransformation miscues which increased through the grades. For retransformation miscues, they found that the concern for graphic proximity was moderated as concern for structure increased. For nontransformation miscues, the percent of miscues showing syntactic proximity is higher, while for retransformation miscues the percent of miscues showing semantic proximity is higher.

In a study of grammatical restructurings, Burke (1969) found that miscues which alter the grammatical structure of the text tend to occur at pivotal points in the sentence structure. At these points, acceptable alternate choices are possible. This finding is confirmed in K. S. Goodman and C. Burke's (1969) and Goodman's (1971) studies.

Looking at structure on an operational level, Allen (1969) identifies two levels: Operations on surface structure and operations on deep structure. Allen found that

phrase level substitutions constitute the largest number of substitutions at all three grade levels studied: Second, fourth, and sixth. Since these substitutions involve larger units of syntax and meaning, Allen suggests that the phrase may represent the most significant unit of analysis in the reading process.

Goodman and Burke (1968) offer a number of conclusions about corrections. The percent of correction is affected by the miscue type. Substitutions, substitutions with insertions, and omissions are highest in percent of correction. Miscues which have a perceptual stimulus in the periphery have a higher percent of correction than those that don't.

The percent of correction is affected by syntactic and semantic acceptability. Two findings are of note: The highest percent of correction occurs when the miscue is acceptable only with prior syntax and the percent of correction is consistently higher for each of the syntactic categories than for the corresponding semantic categories (Goodman & Burke, 1968). Correction based on semantic acceptability occurs most frequently when the miscue is acceptable only with prior meaning.

For the proficient readers studied, Goodman and Burke (1968) report an extremely high percentage of successful correction attempts, 90%. K. S. Goodman and C. Burke (1969) noted the importance of structural acceptability and graphic proximity to correction attempts. As

graphic proximity increases, there is a tendency not to correct miscues.

Researchers have tested the validity of the Goodman Taxonomy in relation to a number of variables external to the reader and within the reader. Page (1970) investigated the relationship of miscue phenomena to graded material, using material ranging in difficulty from preprimer to the sixth grade. Carlson (1970) analyzed the miscues made by students reading selections differing in content, including science, social studies, and basal reading texts. Martellock (1971) used children's manuscripts and analyzed reading errors when children read their own manuscripts. Thornton (1973) related miscue phenomena to the reading of stories with and without prior purposes being set.

Four studies concerned variables within the reader. Sims (1972) contrasted the miscues of Black students reading standard English and Black dialect materials. In another comparative study, Romatowski (1972) investigated the oral reading of Polish and English texts by bilingual students. In an exploration of the effect of differences in the background of the reader, Rousch (1972) studied the effect of a highly relevant conceptual background on reading. Gutknecht (1971) studied students who had been identified as perceptually handicapped. He indicated that there was little difference between their miscues and those of normal readers. Syntactic and semantic strategies were used by all students. The major difference was the

inability of his students to shift strategies when necessary. Several students continued to use grapho-phonemic strategies even when these were no longer successful. Gutknecht concludes that perceptually handicapped readers progress at a slower rate than normal readers.

In her longitudinal study, Y. Goodman (1971) found differences between average and slow readers in the use of strategies. Average readers were able to emphasize one strategy to a greater extent than others while still keeping all strategies operating together. Goodman identified developmental trends in the slow reader's use of strategies and noted that they seemed to be moving toward the percentages of average readers. She identifies a developmental pattern which follows these stages: (a) omit unknown words; (b) use sounding out techniques (may produce nonwords, but they have closer phonemic and graphic proximity than other miscues); and (c) identification of the right word. These stages are similar to those of Biemiller (1971) and MacKinnon (1959).

The Goodman Model

The most comprehensive study of oral reading using the Goodman Taxonomy is Goodman's (1973) study. Goodman studied 94 students reading at proficiency levels ranging from low second grade to high tenth grade. He reports six general findings. First, reading at all levels was consistent with the Goodman model of reading. Second, he found

that low proficiency readers use the same process as high proficiency readers but less well. Their strategies are less efficient, the result being that they use more graphic, syntactic, and semantic information than they need and lose more of the potential meaning. A third finding was that differences in the ability to handle complex syntax disappear among readers of moderate to high proficiency. Fourth, the one consistent difference between groups at successive proficiency levels is their ability to comprehend material read. Fifth, the percent of miscues semantically acceptable before correction was found to be the best indicator of reading proficiency. And finally, he found no evidence of a hierarchy of skills of reading development.

Goodman (1973) offers further support for many of the previously stated findings. While he found no straight line relationship on any measurable dimensions as readers gain proficiency, he did find relationships among dimensions and patterns which are generally true for proficient readers. His findings in the following areas are discussed: Miscues, graphic and phonemic acceptability, syntactic and semantic acceptability, correction, and comprehension.

Regarding miscues per 100 words, he found that means were consistently lower as proficiency increased. The range of MPHW was narrowest for all high groups and widest for low groups. These ranges tend to overlap so that an individual's reading proficiency may not be judged simply by counting MPHW. His qualified conclusion is that

"Readers who are efficient tend to produce fewer miscues" (Goodman, 1973, p. 32).

In agreement with earlier findings, phonemic means were consistently lower than graphic means though the differences were never great. Graphic and phonemic means were found to be similar across levels and across ranks within each grade level except for low readers in grade 2 and some low readers in grade 4. Thus only lower grade readers show evidence of difficulty in grapho-phonic information in reading. Goodman contends that research shows that there is little evidence that "phonics" problems are of considerable importance in differentiating readers of varied proficiency. He does identify differences in patterns of grapho-phonemic proximity by grade level. For sixth grade and above, high graphic and phonemic proximity is associated with low comprehending, semantic, and syntactic acceptability, whereas, in the second and fourth grade there is a positive correlation between these variables. In the second and fourth grade, higher quality miscues are associated with higher graphic and phonemic proximity.

Regarding correction strategies, Goodman confirms the importance of syntactic acceptability and semantic acceptability. He found that no group corrects more than 38% of its miscues. Relative to groups of different proficiency levels, he reports that low groups above the fourth grade tend to show less correction than average and high groups.

As reported in previous studies, means for semantic acceptability were lower, approximately 15 to 20%, than syntactic acceptability means. Goodman notes that while variation in story difficulty affects both syntactic and semantic acceptability, it affects semantic acceptability more.

Goodman identified two measures of a reader's understanding of a selection: Comprehension rating which is an evaluation of a student's oral retelling, and comprehending which is a measure of the percent of all miscues fully semantically acceptable and the percent of those not semantically acceptable but successfully corrected. The comprehending measure provided insight into the reader's concern for meaning. The comprehension patterns were found to be roughly similar to the comprehending patterns on the same stories. Higher means were found on comprehending for lower grade groups, whereas higher grade groups had higher comprehension ratings. Each measure has a limitation. The comprehension rating is limited since the reader may be unwilling to express all that he has understood. On the other hand, the comprehending rating does not reflect the silent correction phenomena.

Using data from all groups, Goodman identifies the following patterns. Comprehending was found to have strong positive relations with semantic and syntactic acceptability. Comprehending was moderately related to the percent of correction and comprehension. A relatively strong

negative relationship was identified between comprehending and MPHW, and between MPHW and semantic acceptability. There were moderate negative relationships between MPHW and correction for all groups but second.

Dialect-involved miscues were not found to interfere with the reading process or the construction of meaning. Students whose oral speech showed dialect were not consistent in using dialect in their oral reading. Goodman concludes that while shifts from the author's to the reader's dialect occurred among most readers in the study, readers were never completely consistent in shifting dialect.

General Findings of Studies Based on the Goodman Model

While the variables in the studies discussed are different, the results support a number of general conclusions. These will be discussed in terms of five categories: Miscues, graphic and phonemic proximity, syntactic and semantic information, regressions, and correction.

Individuals have distinct and widely varying patterns of miscues, both the percent of occurrence and the miscue type. All miscues are not of equal significance to the reader. Y. Goodman (1970, p. 455) writes

> There is no question that certain types of miscues are of a higher order than others; miscues of low order give way to miscues of higher order as children become more proficient readers.

Certain miscue patterns have been identified.

Close graphic proximity is involved in a high percentage of total miscues. Close phonemic relations are involved in a low percentage of total reading miscues. Mean scores for semantic acceptability of miscues are generally lower than syntactic acceptability means. Deviant dialect is involved in a low percentage of the total reading miscues.

Regarding syntactic information, all readers demonstrate strong control of syntactic structure. They are better able to control syntactic structure than meaning. There is a strong tendency for miscues to retain high syntactic and semantic proximity to the text. And with high regularity, the grammatical function of the text is retained in the miscue.

Regressions are not truly a separate category in a Goodman analysis since they reflect an attempt at correction and not miscues in and of themselves.

As with miscues, the percentages of correction reflect both individual differences and group trends. When children attempt their own correction of miscues, they are successful 50% or more of the time. Semantic and syntactic screens are important factors in correction strategies. There is a tendency to correct unacceptable structures and structures acceptable only with the prior portion of the sentence and not to correct acceptable structures. Thus children are less likely to correct a miscue when the resulting passage sounds like meaningful language. Dialect miscues are seldom corrected.

And finally, no consistent relationship was found between the number of miscues, the percent of correction, and comprehension.

Studies Using the RMI

Researchers using the RMI have investigated the effects of different teaching methods, proficiency levels, grade levels, classroom procedures, and language background.

M. S. Burke (1973) studied the oral reading of first-grade students taught by the synthetic method and by the analytic method. Readers taught by the synthetic method were found to stress graphic/sound relationships in reading and only minimally utilized cues from syntactic and semantic components. They showed weaknesses in the area of comprehension and retelling. For the analytically taught group, mean percentages in graphic and sound cueing systems indicate slightly less proficiency in the use of these systems than the synthetically taught group. Burke says that these readers are developing the use of all cueing systems although their use of the semantic system is still inadequate. However, the analytically taught readers did not sacrifice as much meaning as the synthetically taught readers based on the retelling score. Burke contends that the analytically taught reader is less likely to resort to word by word processing because he has a sense of the interaction of cueing systems.

Brody (1973) examined the oral reading miscues of

proficient and retarded readers, both groups reading at the fourth grade level. Like Y. Goodman (1971), Brody found that the remedial readers made more miscues. They also showed less efficient use of grapho-phonemic cues. As they progressed through the text, the remedial group's miscues increased rapidly. Brody concluded that as they tired, remedial readers used mechanical strategies more than syntactic and semantic cues. For both groups, 38% of the miscues corrected resulted in overcorrection.

Previous studies had extended miscue analysis to the 10th grade level. Hoffner (1973), extended miscue analysis to the junior college level.

Two other studies used the RMI to investigate oral reading. Watson (1973) used the RMI to develop classroom procedures and activities. Young (1972) used the same instrument to study the reading miscues of fifth-grade Mexican-American readers.

Summary

The purpose of this review of linguistic studies of oral reading has been to provide a normative baseline for comparison later with the performance of reflective and impulsive children. The main findings are reviewed here according to the following categories: Developmental trends, miscues, graphic and phonemic similarity, syntactic and semantic acceptability, correction, and comprehension.

Biemiller (1971) and MacKinnon (1959) have

identified developmental trends in the use of contextual and graphic constraints. The most advanced stage involves the co-occurrence of both contextual and graphic materials. Goodman (1973) found differences in patterns of grapho-phonemic proximity by grade level. For fourth-grade students and younger, high grapheme-phoneme proximity is associated with high comprehending scores, whereas, for older students, high grapheme-phoneme proximity is negatively related to comprehending scores. Y. Goodman (1971) identified developmental differences among second and third graders in the ability to emphasize one strategy while keeping all strategies operating together.

Findings relative to the number of miscues have not been completely consistent. For the most part, miscues per 100 words have not been found to be a consistent indicator of comprehension. However, Goodman (1973) concludes that readers who are efficient tend to produce fewer miscues. On the other hand, Y. Goodman (1971) asserts that MPHW do not indicate a pattern of developing reading proficiency. Brody (1973) found differences between proficient and remedial fourth-grade readers in the number of miscues. In another quantitative measure, Menosky (1971) found that the number of miscues increased with the length of the selection. Based on these findings, this reviewer concludes that the number of miscues is often related to reading efficiency but is not by itself a valid predictor of reading efficiency.

In miscue analysis, graphic proximity has consistently been found to be greater than phonemic proximity. A high degree of overlap has frequently been found between syntactic and semantic appropriateness (Y. Goodman, 1967; Kolers, 1970; Weber, 1970). It has generally been found that all readers show strong control of syntactic structure and are better able to control structure than meaning. K. S. Goodman and C. Burke (1969) report that nontransformation miscues and retransformation miscues (change in syntactic structure) differ in the degree of semantic versus syntactic proximity. Since retransformation miscues have higher semantic proximity, they may be associated with higher comprehension than nontransformation miscues.

The percent of correction is affected by the miscue type, syntactic acceptability, and semantic acceptability. No group corrected more than 38% of its miscues (Goodman, 1973). Brody (1973) in a study of proficient and retarded readers reading at fourth-grade level found that 38% of those miscues which were corrected resulted in overcorrection.

Goodman (1973) found that the ability to comprehend material read was the most consistent discriminator of performance between groups at successive proficiency levels. Graphic and phonemic accuracy is associated with comprehending for children in grades 2 and 4 but not in grades 6, 8, and 10. Comprehension patterns (based on oral retelling) have been found to be roughly similar to comprehending

patterns (based on the percent of miscues semantically acceptable).

Few investigators have related oral reading to differences in cognitive style and information processing. The results of these studies have been inconsistent. Only one study (Butler, 1972), discussed in a later section, has investigated R-I and oral reading analyzed using the Goodman Taxonomy. Unlike the present study, Butler used selected items from the Goodman Taxonomy. The results of the present study using fourth-grade males will be compared to Butler's results using second-grade males. And in order to provide a broader interpretation of the results, the psycholinguistic data summarized here will be considered relative to the performance of R and I students.

Background of Reflection-Impulsivity

In a series of studies with children in grades 1 to 4, Kagan et al. (1964) investigated the immediate and historical determinants of a preference for analytical conceptual groupings. The analytic concept is based upon the shared similarity in a particular objective component among a set of stimuli (for example, selecting from a group of the same and different animals those animals having one ear). Their results led them to discover two more fundamental cognitive dispositions, each of which contributed variance to the production of analytic concepts. One of these dispositions is being investigated in this study,

that is "the tendency to reflect over alternative solutions in situations in which several response alternatives are available simultaneously" (Kagan et al., 1964, p. 1). The other is the tendency to analyze visual arrays into component parts. Kagan et al.'s investigations indicated that the tendency to delay a conceptual decision, that is to reflect, was associated with the production of analytic concepts on the Conceptual Style Test (Sigel, 1967).

Kagan (1966a) asserts that these two dispositions, reflection and impulsivity, which may be viewed as two aspects of information processing, may contribute to age and individual differences in the form and quality of cognitive products. He identified three operations which take place when a person faces a problem: (a) initial categorization of the relevant information, (b) storage of the coded categorization, and (c) imposing of transformations upon the encoded data. The first operation may be related to differences in the degree of stimulus analysis that precedes initial coding. The second two operations may be related to the degree of reflection accompanying classification and hypothesis selection.

The operational definition of the reflection variable is response time in problem situations in which the student is presented with a standard stimulus and an array containing the standard, and 5 to 10 highly similar variants. Kagan et al. (1964) developed the Matching Familiar Figures Test to measure this variable. There are no norms

for the 12 item test, judgments of reflection and impulsivity are relative to the population taking the test. However, based on his investigations Kagan reports that impulsives in grades 1 to 4 have a mean response time between 4 and 10 seconds and make about 15 to 20 errors on the test. Reflective children have mean response times between 30 and 40 seconds and make between two and six errors.

Messer (1975) reports norms for response time and errors according to grade level. For children in grades 3 to 5, the mean response time per item for reflectives is 30.0 seconds and for impulsives is 9.1 seconds. The mean number of errors on all 12 items is 5.1 for reflectives and 11.4 for impulsives. For the majority of studies reviewed here, reflective students are defined as those who score above the median on response time and below the median on errors. Impulsive students are those who score below the median on response time and above the median on errors.

In terms of a problem-solving sequence, R-I refers to the degree to which the student considers alternative hypotheses in contrast to reporting hypotheses with minimal evaluation of their probable validity. In a study of fourth- and fifth-grade children Kagan (1965a) coded the number of times the student's eyes moved back and forth between the standard and variants. He found a high correlation between the number of distinct eye scanning movements and response time to the first selection. He concludes that students were actively considering alternative

answers during the long delay.

Kagan (1965b, 1966b) makes three qualifying statements about response time. First, statements about response time apply only to problems in which all alternatives are available simultaneously. Second, the tests used must be of optimum difficulty for each age level so that fast response times typically lead to high error scores. Third, Kagan assumes that response times to the specific tasks used are true reflections of decision times.

In his studies investigating the characteristics of R-I, Kagan (1965a, 1966a) and Kagan et al. (1964) have identified a developmental trend. The results of a study using the MFF and the Haptic Visual Matching Test with children in grades 1 to 3 show a trend for decreasing errors and increasing response latencies with age. In a study using tachistoscopic scenes, Kagan (1965a) found that eighth-grade students average longer response latencies than second- and third-grade children.

Generality and Dynamics

Researchers have shown that the R-I dimension generalizes across a variety of tasks. Notable consistency has been found for recognition error scores across three tasks: The Matching Familiar Figures Test (MFF), the Design Recall Test (DRT), and the Haptic Visual Matching Test (HVM) and even higher intertask consistency for response times across the three tasks (Kagan 1965a, 1966b).

In these three tasks the response alternatives were given. Kagan (1965b) also examined tasks in which the student had to generate alternatives mentally. He found that response time to tachistoscopic scenes correlated significantly with response time on the MFF and the HVM. In this same study, Kagan analyzed the completeness of children's drawings and found that completeness was moderately positively related to reflection. Using several different tests which omit the matching to sample feature but offer several response possibilities under conditions of high response uncertainty, Ward (1968) found significant intercorrelations among response latencies. Latency and error scores showed negative correlations.

Decision time also generalized to an interview situation. Using questions likely to cause response uncertainty, Kagan (1965a) reports that delay in an interview correlated with response time on the MFF and response time to tachistoscopic exposures.

The degree of motor restlessness and distractability are related to R-I. In one of a series of studies of children in grades 1 to 4, Kagan et al. (1964) found a relationship between motor restlessness or distractability and conceptual impulsivity. Using a ratio of the time spent attending to a task divided by the time spent distracted, the researchers found differences between impulsive and nonimpulsive children. R-I also related to task persistence. In a study of 108 fourth- and fifth-grade

students, Kagan (1965a) found positive associations between a reflective disposition and the tendency to choose to work on difficult tasks and to persist with these tasks.

Kagan (1966a) found a negative relationship between recognition errors and verbal ability as measured on three verbal subtests of the WISC: Vocabulary, information, and similarities. The relationship between verbal abilities and errors was typically lower for boys than for girls. Messer (1975) reports a "consistent, moderate overlap" between MFF and the Embedded Figures Test by Witkin (p. 16). He suggests that the moderate association between R-I and field dependence-independence may be due to the similarity of the requirements of MFF and EFT. He observes that "Both contain response uncertainty and require scanning and analysis of a visual field" (p. 16).

R-I does not generalize to a number of areas. Low and typically nonsignificant relations have been reported between verbal skills and response time (Kagan, 1965a, 1965b, 1966a).

Stability of Reflection-Impulsivity

As the research discussed indicates, the disposition to R-I generalizes across varied problem situations. Researchers have also shown that this disposition is moderately stable over a period of up to two and one-half years (Kagan et al., 1964, 1965a, 1966b; Messer, 1970b). In a number of studies of school-age children, Kagan found

notable intraindividual stability of response time over a period up to 20 months. Long response times on varied perceptual tasks showed greater stability over time than recognition error scores. Messer (1970b) examined the stability of R-I over a two and one-half year period. Sixty-five boys were studied in grade 1 and grade 3. A median split analysis was performed on response time scores and on error scores for grade 1 and grade 3 separately. Based on response time and errors, the children were distributed in three groups. A comparison of the distribution of children in grade 1 with the distribution in grade 3 shows significant relationships between the distributions. Messer reports moderate stability over a two and one-half year period. He also reports that children who failed a grade possess verbal skills comparable to their peers but were more impulsive at the start of grade 1 and two and one-half years later.

In an earlier investigation of students at the Fels Institute, Kagan and Moss (1962) found that ratings of hyperkinesis during the period from three to six years predicted phenotypicaliy similar behavior during ages 6 to 10 and 10 to 14. An excess of spontaneous gross motor behavior has been associated with an impulsive disposition. Kagan and Moss also found that hyperkinesis at ages 6 to 10 was inversely correlated with ratings of involvement in solitary intellectual mastery among adult men. Based on these findings, Kagan and Moss suggest that constitutional

variables and/or early learning may influence R-I. It should be noted that this has not been proven.

Kagan (1966a) concludes, "In sum, response time appears to be a critical conceptual variable, it shows generality over tasks, stability over time and is relatively independent of verbal skills" (p. 500).

Modification of Reflection-Impulsivity

Another area of investigation which has important implications for education is the modifiability of R-I. Researchers have studied a number of variables including direct instruction and training, observation of models, teacher tempo, rewards, and anxiety factors. These will be discussed in the following review.

In Denney's (1973) study seven- and eight-year-old children were instructed to hasten or delay their responses on a test of hypothesis seeking and constraint seeking conceptual strategies. He found that attempts to hasten or delay responses were successful in changing response latencies. The correlations between measures of response latencies and the measures of conceptual strategies were all significant; however, error scores did not correlate significantly with either measure of conceptual strategy. It should be noted that children who were reflective showed greater responsiveness to both reflective and impulsive instructions than did I students. Albert (1970) studied second- and third-grade I students to determine if I

students could be taught to discriminate more accurately and make fewer errors. Using three treatment conditions, he found that the group trained to scan the stimuli and eliminate incorrect alternatives before responding showed a significantly greater increase in reaction time and decrease in errors over the group instructed to delay and the no treatment group. It appears that training in discrimination is more important to the reduction of errors than instructions to delay responding. In another study, Duckworth et al. (1974) found that retarded pupils trained in visual discrimination made fewer errors and increased in response time compared to pupils who received no training.

Ayabe (1969) used training sessions and trainer demonstrations in an effort to modify reflective and impulsive behavior. He found that training in impulsive behavior induced impulsive behavior as indicated by error and latency scores; however, training in reflective strategy was not successful in inducing reflective behavior. Zelniker and Oppenheimer (1973) varied training methods using a matching to sample method (select the one which is the same as the standard) and a differentiation method (select the one that is different from the standard) with 60 I kindergarten students. I students who received training in differentiation learned to process features which distinguish among stimuli, whereas, the students who had matching training did not show a preference for a particular mode of perceptual learning.

In addition to direct instruction, observation of models appears to contribute to the modification of R-I. Kagan, Pearson, and Welch (1966b) investigated the effect of perceived similarity to the trainer on R-I among first-grade children. The experimenter told the child that he was reflective and valued reflection. The training procedure for delay was direct, requiring the child to wait a fixed period before responding. The only important effect of training was lengthened response time to MFF. Error scores were not affected by training. Kagan et al. (1966b) conclude that the facilitating effect of perceived similarity to the trainer was only minimally supported.

Debus (1970) studied third-grade I students who observed sixth-grade models. There were three conditions for model behavior and two different reinforcement contingencies. He found that error scores were not affected by any of the experimental treatments. Response time increased for boys and girls who observed a successful reflective model who received positive reinforcement. For girls, the change and dual models also produced increased latencies. However, the only condition that produced a durable effect over a two and one-half week period was the change condition and this was true only for girls. In another study of the influence of peer models, Cohen and Przybycien (1974) found that fourth- and fifth-grade children who viewed models demonstrated a significant increase in response time and a significant decrease in errors. In contrast to

Debus' (1970) study in which older students were models for younger ones, Cohen and Przybycien used sociometrically chosen peers as models. They were trained to provide reflective verbal and behavioral cues when they performed the selected task.

Observation of film-mediated models also affects the disposition to R-I. In a study of 100 fourth-grade boys, Ridberg, Parke, and Hetherington (1971) report that both response latency and error rates were modified.

Yando and Kagan (1968) investigated the effect of teacher tempo on conceptual tempo. Girls and boys in classrooms of experienced reflective teachers showed the largest increase in response time. However, error scores were not altered appreciably by teachers. Yando and Kagan suggest that delay is generally associated with accuracy, but when a child's strategy is being changed, it appears to be possible to alter delay without affecting accuracy.

The results of the studies cited indicate that conceptual tempo is modifiable; however, modifying response time does not necessarily lead to modification of error rate.

Finney (1968) varied reward conditions using symbolic and concrete rewards. He found that impulsivity was not significantly reduced by token rewards. Enforced response latency was the only experimental treatment which significantly decreased error rate.

Kagan et al. (1964) suggest that one reason that an

impulsive child responds quickly without critical examination of his hypotheses is that he has built up anxiety from repeated failures. Kagan partially tests this hypothesis in a study of the effect of an impersonal versus a reassuring experimenter on the tempo of the child. He found that the testing condition had a minimal effect on response time and error scores. He concludes from this that reflection and impulsivity are fundamental tendencies in the child and are not easily changed by experimenter rapport.

In a study of the effect of anxiety over intellectual performance on R-I, Messer (197Ca) found that a failure condition and a no manipulation condition in which there was perceived failure both led to an increase in response time compared to a success condition, which led to a decrease in response time. The results of a study by Ward (1968) support this finding. As noted earlier increases in response time are no guarantee of increased accuracy though they are often related. Messer (1970a) found that impulsives who increased in response time under the failure and no manipulation condition decreased in errors. On the other hand, reflectives who decreased in response time increased in errors. Messer concludes that anxiety or concern over intellectual performance leads to increased reflectivity before responding on the MFF.

Reflection-Impulsivity and Reading Ability

Jerome Kagan's (1965c) study "Reflection-Impulsivity and Reading Ability in Primary Grade Children" is the

foundation study linking conceptual tempo and reading ability. Kagan justifies his expectation of a relationship stating that

> The 6-year old child learning to read is confronted with a discrimination problem with high response uncertainty. It seemed reasonable, therefore, to expect that children who were characteristically reflective would commit fewer word-recognition erros than impulsive children. (1965c, p. 610)

To assess reading ability, Kagan used a letter-recognition test (the letters of the alphabet on 3 x 5 cards), a word recognition test (five words on a card, match one to the word said by the experimenter), and an oral reading sample. He found that I students in grade 1 had the highest reading error scores at the end of the second grade, whether words were presented singly or in a prose selection. The correlations with MFF response time were in the expected direction but were not as significant as MFF error scores. The results were more equivocal for boys than for girls. MFF errors were a better predictor of reading performance for girls; in contrast, MFF response time was a better predictor among boys.

Long response times on MFF in grades 1 and 2 predicted low reading error scores at the end of grade 2. However, no relationship was found between MFF response time or MFF errors in grade 1 and the degree of reading performance over the year. The relationship between fast decision times and reading errors was higher for high verbal than for low verbal students. Based on these

results, Kagan concludes that "the child's tendency to make fast decisions in problems with high response uncertainty is one determinant of the quality of reading performance" (1965c, p. 627).

A number of studies have investigated further the relationship between conceptual tempo and reading. Using a group of 65 disadvantaged first-grade children, Kalash (1972) investigated reading readiness and R-I. She found that children with a reflective conceptual tempo have higher reading readiness scores than children with an impulsive tempo. Lesiak (1970) studied 30 first-grade and 30 fifth-grade children. He found that reflective girls in first grade performed better on measures of word recognition, comprehension, and critical reading than I students. On the other hand, reflective first-grade males performed better on a measure of critical reading but did not differ markedly from impulsive boys on measures of word recognition and comprehension. No significant trends were found for fifth-grade students. Lesiak concludes that cognitive style is more important for a child acquiring reading skills than for the child who is an accomplished reader.

The relationship between conceptual tempo and reading is further challenged in a study of 80 second- to fifth-grade children (Denney, 1974). Denney analyzed the results of three reading tests: The Gilmore Oral Reading Test, four subtests of the Gates-McKillop Reading Diagnostic Test, and the Peabody Picture Vocabulary Test. He

found no significant correlation between MFF latency scores and reading measures. MFF error score correlated significantly with accuracy, comprehension, and rate on the Gilmore for the total sample but not for separate samples of older and younger children. However, 11 other correlations between reading and cognitive tempo measures failed to attain significance. Denney concludes that cognitive tempo data failed to distinguish between good and poor readers and he questions the importance of this dimension to reading ability.

King (1972) sought to determine whether 83 second-grade children grouped according to R-I and taught by teachers specifically instructed concerning the R-I dimension would differ on this dimension at the end of a treatment period. She reports that grouping based on the degree of reflection or impulsivity had no effect on the reading progress of the experimental groups in grade 2. King suggests further studies varying teacher training, specific materials, and time period.

Drake's (1970) study of perceptual correlates of R-I appears to have direct implication for reading, specifically in regard to information processing. Drake used Mackworth's eye-marker camera to record eye fixations of impulsive and reflective third graders and college students. By the time of response R students had looked at a larger portion of the stimulus figures and in greater detail than impulsives. Reflectives made about twice as many comparisons between or among homologous parts of different figures.

The key study in relation to the present research was conducted by Butler (1972) and entitled "A Psycholinguistic Analysis of Oral Reading Behavior of Selected Impulsive and Reflective 2nd Grade Boys." Butler studied the oral reading of 30 average second-grade males who were identified as reflective or impulsive on the MFF. The purposes of Butler's study were to determine whether I students make more errors when comprehension is controlled, whether the miscues of I students are more semantically acceptable than those of R students, and whether the reading of R students is characterized by more frequent hesitation and repetition. Any repetition of a correct response was considered a repetition miscue. Correction of a miscue was labeled self-correction and tallied separately from repetitions. He used the following components of the Goodman Taxonomy: Miscue frequency, semantic acceptability of miscues, hesitation and repetition frequency, and self-corrections.

Butler found that reflectives made more repetitions than impulsives, even when differences in nonverbal intelligence were controlled. However, the two groups did not differ significantly in the number of hesitations. R students corrected a larger percentage of miscues compared to I students, even when the intelligence factor was controlled. The number of errors on MFF correlated negatively with the percent of miscues corrected. No significant differences were found with regard to the following: The

number of miscues, even using means adjusted for differences in nonverbal intelligence; the percent of miscues that were semantically acceptable within the context of the total passage; the number of hesitations; and the relative number of hesitations followed by the correct identification of the word, omission, or other miscue. And as in other miscue studies, there was wide variation within each group on each of the dependent variables. In sum, Butler found differences between reflectives and impulsives in only two areas: Repetition and self-correction.

Summary

Linguistic studies, particularly those based on the Goodman model, have yielded considerable data on the reading process. Researchers have found that there are developmental differences in the use of strategies, graphic constraints being used more by younger children and a balance of contextual and graphic constraints by older children. A quantitative measure of the percent of miscues has not been consistently related to comprehension. Differences in the use of strategies between readers have been identified, with proficient readers making more efficient use and sampling of strategies. All readers show stronger control of syntactic structure than semantic structure and make more miscues indicating graphic proximity than phonemic proximity.

Not all errors interfere equally with the meaning

of the selection. Meaning change is less likely for miscues involving function words than for miscues involving other parts of speech. Comprehension has been found to be the most consistent discriminator of performance between groups at different proficiency levels. The percent of correction has not been found to be correlated with high comprehension. In fact, a high percent of correction may be associated with overcorrection. Readers may regress not to correct errors but because of anticipation of difficulties observed in the visual periphery.

Goodman's (1973) suggestion is relevant to the literature reviewed here. He states,

> Perhaps one of the most significant results of our research is the challenge it lays down to researchers, text developers, curriculum planners and teacher educators to examine their work in the light of what is now known about the reading process. (p. 11)

The studies of R-I support some conclusions about this dimension. R-I is characterized by moderate stability over time for school-aged children. It generalizes across varied problem situations. The disposition to R-I may be modified through direct instruction and, to some extent, through observation of models. Research is needed to demonstrate whether R-I can be modified permanently or over a long period of time.

The results of studies of the relationship between R-I and reading have been mixed. There appears to be no single dimension of reading ability which consistently distinguished R from I students. The effect of conceptual

tempo on aspects of reading performance has been found to be significant for primary grade children (Butler, 1972; Kagan, 1965c; Kalash, 1972; Lesiak, 1970). However, the results of studies of intermediate-grade children have been inconclusive. Lesiak (1970) in a study including fifth-grade boys found no significant relationship between R-I and reading. Denney (1974), in a study of second- to fifth-grade children, found that cognitive tempo data failed to distinguish between good and poor readers. Significant correlations have been found more often between MFF error scores and reading variables than between MFF response time and reading variables.

In view of the inconsistent results of studies of intermediate-grade children, there appears to be a need for further investigation of the relationship between cognitive style and reading ability among intermediate-grade students. The studies cited are not truly comparable. The measures of reading tasks have differed. While the present study does not involve the use of the identical measures used by Butler, it does involve comparable measures based on the same psycholinguistic theory. One goal of the present study then was to gather data for intermediate-grade children. If the reading strategies of I students differ from those of R students in ways that significantly affect their reading comprehension then identification of an impulsive cognitive style may indicate a need for specific instruction designed to moderate the impulsive response pattern.

CHAPTER III

PROCEDURE

In this study, oral reading was analyzed using the Reading Miscue Inventory. The procedures for coding and analyzing miscues are outlined in the Reading Miscue Inventory Manual by Yetta M. Goodman and Carolyn L. Burke (1972).

Eleven students were asked to read a story. They were given no assistance. The readings were tape recorded and this investigator recorded the miscues on a typed copy of the story. Following each reading, the student was asked to recall the selection and then asked general questions or specific questions based on information already introduced by the student.

Selection of Students

Eleven students were selected from an initial population of 56 fourth-grade students attending a suburban elementary school. The Matching Familiar Figures Test was individually administered to the 56 students. Response time and errors were the basis of selection of students. Students who scored above the median on response time and below the median on errors were classified as reflective. Students who scored below the median on response time and

above the median on errors were classified as impulsive. Using standard deviation from the norm, eight reflective and eight impulsive boys were initially selected. Five students were eliminated from the study: One moved, one lacked parental permission, two were unable to read the selection, and one was above the median in both response time and errors.

Selection of Reading Materials

In order to provide a basis for comparison with future studies, a story from the Readings for Taping (Y. Goodman & C. L. Burke, 1972) was used in this study. The story is entitled "Space Pet." The reading level is fifth grade according to the Fry Readability Level (1968). The selection is 740 words in length.

Administration of Tests

The MFF was administered individually to each student in an empty classroom. A stop watch was used to record response time. An oral reading sample was obtained for the 11 R and I students.

According to the instructions in the RMI Manual, miscues were recorded next to the expected response on the RMI coding sheet. Prior to filling in the RMI coding sheet, the investigator-marked worksheets were carefully compared to the taped readings to complete the marking and check their accuracy. A sample can be found in Appendix A. Nine questions were asked for each miscue. The nine RMI

questions are:

1. Dialect. Is a dialect variation involved in the miscue?

2. Intonation. Is a shift in intonation involved in the miscue?

3. Graphic similarity. How much does the miscue look like what was expected?

4. Sound similarity. How much does the miscue sound like what was expected?

5. Grammatical function. Is the grammatical function of the miscue the same as the grammatical function of the word in the text?

6. Correction. Is the miscue corrected?

7. Grammatical acceptability. Does the miscue occur in a structure which is grammatically acceptable?

8. Semantic acceptability. Does the miscue occur in a structure which is semantically acceptable?

9. Meaning change. Does the miscue result in a change of meaning?

Answers to these questions were recorded on the RMI coding sheet. Questions 1 and 2 have two possible answers: Yes or no. The remaining seven questions have three possible answers which are determined by the degree of relationship between the expected response and the observed response. The possible answers are: Yes, partial, and no.

A comprehension pattern and a grammatical relationships pattern were identified by interrelating the answers

to certain questions. These patterns give insight into reader strategies and proficiency in using strategies. The grammatical relationships patterns are based on the interrelationships of correction, grammatical acceptability, and semantic acceptability. Based on reader's strength, the coding is: Strength, partial strength, weakness, and overcorrection. The comprehension pattern consists of the interrelationships of correction, semantic acceptability, and meaning change. There are three categories: No loss, partial loss, and loss of comprehension.

The data relevant to analyzing the reader's strengths and weaknesses were recorded on the Reader Profile. The statistical data which are reported in the Reader Profile consist of a tally of each column for questions 3, 4, 5, and both patterns. The column totals were converted to percentages and recorded on the Reader Profile.

The retelling score is also recorded on the Reader Profile. It is an indication of the reader's comprehension of the selection. A transcript was made of the reader's retelling and this was compared to an outline of the reading material. Points were assigned according to the completeness of a reader's response in the categories of Character Analysis, Theme, Plot, Events, and Additional Information.

Also recorded on the Reader Profile were instances of repeated miscues. A listing of repeated miscues gives information about strategies used in discovering a word and habitual association between two words.

Treatment of Data

There are no norms for the Matching Familiar Figures Test. Cutting points for determining R and I students were described in the section titled Selection of Students. Basically performance was judged on response latency and errors.

The data gathered using the RMI are reported in terms of percentages. The results are discussed qualitatively. This seems justifiable in view of Goodman's and Burke's (1972) statement that "The research in which this analysis has been used is basically descriptive, the goal being to describe what happens when a reader at any stage of proficiency reads orally" (p. 11).

In order to determine statistically whether R students differed from I students and whether their cueing patterns differed, a Mann-Whitney U test was used. The U values were obtained for the following areas: Response time, errors, comprehension, comprehension pattern, semantic acceptability, comprehending, and grammatical relationships.

The first 25 miscues were analyzed in depth. In his comprehensive study, Goodman (1973) analyzed in depth the first 25 miscues.

CHAPTER IV

FINDINGS

The results of this study are necessarily tentative in nature. As stated in the limitations, there was a small pool of students who took the MFF. For the original population taking the MFF the coefficient of correlation between response time and errors is -.24. Boys who were above the median in response time and below the median in errors were labeled reflective and those who were below the median in response time and above the median in errors were labeled impulsive. Since MFF scores were the basis of selection, the students differed initially in reading ability as measured by a standardized test. The comprehension grade level for reflective males was higher than the grade level for impulsive males (Table 1). The results should be considered only suggestive of the relationship between R-I and oral reading.

The findings of this study are both qualitative and quantitative. The RMI is a qualitative device, the purpose of which is to gain insight into the reading process. The goal is not to segment the cueing systems a reader uses but rather to identify the relationship between cueing systems. All of the scores on the RMI are relative scores. They

TABLE 1

DESCRIPTION OF SAMPLE OF FOURTH-GRADE BOYS USED IN THE STUDY

Student	RGL*	Latency	Errors	Student	RGL*	Latency	Errors
A	3.6	329.5	1	F	3.5	75.0	10
B	5.6	289.0	8	G	4.0	73.0	13
C	2.9	228.5	9	H	2.3	39.5	20
D	3.8	181.0	7	I	2.8	36.0	13
E	6.4	139.0	6	J	2.5	34.0	10
				K	1.9	29.0	12
Mean	4.5	214.9	6.2	Mean	2.7	47.8	13

*RGL is the comprehension grade level for the California Achievement Test, Form A, Level 2, given in April, 1975.

indicate what a reader is stressing and not stressing as he reads.

The results will be presented in the following manner. First, the sample of students will be identified. Second, the quantity of miscues will be identified. Then the evaluation of miscues in relation to each of the RMI categories and the interrelationship patterns will be presented. Third, the retelling scores and comprehending scores will be presented. Finally, a Mann-Whitney U Test will be used to statistically analyze the results in the categories of response time, comprehension, grammatical relationships pattern, comprehension pattern, semantic acceptability, and comprehending.

The fourth-grade boys who were studied are described in Table 1.

Quantity of Miscues

The total number of miscues generated by each reader is presented in Table 2. As is true throughout there is overlap in the quantity of miscues made by reflective readers and the quantity made by impulsive readers. There is an overlap in the scores of reflectives and impulsives in all areas studied. For example, the total number of miscues for R students ranged from 36 to 133 compared to a range of 31 to 200 for I students.

To facilitate comparison with other studies and other reading samples, the number of miscues per 100 words is derived. This is obtained by dividing the total number of words in the selection into the total miscues and then multiplying by 100. The MPHW generated by each student are presented in Table 3.

Using only this quantitative measure, readers E and G appear to be the most effective readers and F the least effective. Although reflective readers made fewer miscues than impulsive readers, a Mann-Whitney U test score of 10 indicates that there is no significant difference between the two groups.

RMI Evaluation

Nine RMI Categories

Dialect.--Only one student, A, made miscues related to dialect. Eight of his first 25 miscues or 32% were

TABLE 2

TOTAL NUMBER OF MISCUES FOR REFLECTIVE AND IMPULSIVE GROUPS

	A	B	C	D	E		Mean
Reflective	86	47	69	133	36		74.2
	F	G	H	I	J	K	Mean
Impulsive	200	31	116	68	125	136	112.7

TABLE 3

MISCUES PER 100 WORDS (MPHW) FOR REFLECTIVE AND IMPULSIVE GROUPS

	A	B	C	D	E		Mean
Reflective	11.62	6.35	9.32	17.97	4.86		10.02
	F	G	H	I	J	K	Mean
Impulsive	27.03	4.19	15.68	9.19	16.89	18.38	15.23

dialect related. Seven of these involved changing the tense of the verb. Five involved omitting the "ed" at the end of the word. The other two miscues were made on words which require changing the word in order to change the tense. The following examples show the miscue which shall be labeled the observed response (OR) above the expected response (ER). All examples in this study will be presented in this manner.

OR: decide	OR: choose	OR: came
ER: decided	ER: chose	ER: come

Intonation.--The only intonation miscues which are coded are those which resulted in a change in the grammatical structure or the meaning of the passage. Of the 12 students studied, only 1 made more than one intonation miscue in the miscues analyzed. Student C made three intonation miscues totaling 12% of his miscues. In every case he omitted the required intonation at the end of the sentence and provided the intonation for the period after the next one or two words in the following sentence. None of his intonation miscues are syntactically acceptable. The intonation miscue usually interfered with the meaning of both sentences.

OR: She could stay that way because nothing has any weight in space before. I recovered from the surprise of seeing a canary in our space station, she did a kind of backward loop.

ER: She could stay that way because nothing has any weight in space. Before I recovered from the surprise of seeing a canary in our space station, she did a kind of backward loop.

Graphic and sound similarity.--Graphic and sound similarity are judged only when a single word or nonword is substituted for a single text item. Tables 4, 5, 6, and 7 show the percent of word-level substitutions involving some degree of graphic similarity to the text. As with quantity of miscues, the range of substitutions involving high graphic similarity was wider for I students than for R students. Table 4 shows the percent of word level substitutions involving high, partial, or no graphic similarity to the text.

Eighty percent or more of the word level substitutions show some graphic similarity. This is illustrated by combining the percent of substitutions involving high similarity with those involving partial similarity. Table 5 shows the percent of substitutions which have some graphic similarity to the text.

For each student the percent of substitutions showing high graphic similarity was higher than the percent showing high sound similarity. The difference was never larger than 21% and averaged 12.5%. The mean difference between graphic similarity and sound similarity was greater for R students, 14.1%, than for I students, 11.1%. Comparing the groups on the use of graphic and phonemic cues, R students stressed graphic cues more than I students did.

Table 6 shows the percent of substitutions involving high, partial, or no sound similarity.

The range of word level substitutions involving

TABLE 4

GRAPHIC SIMILARITY FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E		Mean
High	82	65	63	66.7	79		71.1
Partial	9	15	26	16.7	16		16.5
None	9	20	11	16.7	5		10.3
Impulsive	F	G	H	I	J	K	
High	52	42	88	87.5	68	57.9	65.9
Partial	48	42	8	0	21	31.6	25.1
None	0	16	4	12.5	11	10.5	9

TABLE 5

HIGH AND PARTIAL GRAPHIC SIMILARITY FOR REFLECTIVE AND IMPULSIVE GROUPS*

	A	B	C	D	E		Mean
Reflective	91	80	89	83.3	95		87.7
	F	G	H	I	J	K	
Impulsive	100	84	96	87.5	89	89.5	91

*Given in percentage.

TABLE 6

SOUND SIMILARITY FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E		Mean
High	72	45	42	55	74		57.6
Partial	14	25	42	28	21		26
None	14	30	16	17	5		16.4
Impulsive	**F**	**G**	**H**	**I**	**J**	**K**	**Mean**
High	48	37	75	69	58	42.1	54.9
Partial	39	26	12.5	25	26	36.8	27.6
None	13	37	12.5	6	16	21.1	17.6

TABLE 7

HIGH AND PARTIAL SOUND SIMILARITY FOR REFLECTIVE AND IMPULSIVE GROUPS*

	A	B	C	D	E		Mean
Reflective	86	70	84	83	66		83.6
	F	G	H	I	J	K	Mean
Impulsive	87	63	87.5	94	84	78.9	82.4

*Given in percentage.

high sound similarity was again wider for I students than for R students, though the difference between the two groups was not large.

Some sound similarity exists in 63% or more of word level substitutions. Table 7 shows the combined percent of substitutions showing high sound similarity and those showing partial sound similarity.

Grammatical function.--Grammatical function can only be determined for word level substitutions. Table 8 shows the percent of miscues which are identical, indeterminate, and different from the grammatical function of the text.

The grammatical function of the expected response was retained in at least two-thirds of the substitutions made by each reader.

OR: I no time at all. . . .

ER: In no time at all. . . .

In this case the range is higher and wider for R students compared to I students.

The percents for grammatical function do not show correction. Table 9 shows the rates of correction for miscues which did not retain the grammatical function.

Correction.--Table 10 shows the percents of successful, attempted, and unsuccessful correction for the first 25 miscues.

While the span in percentage points is identical for both groups, the range is higher for R students

TABLE 8

GRAMMATICAL FUNCTION FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E		Mean
Identical	91	80	89	67	79		81.2
Indeterminate	0	0	0	0	0		0
Different	9	20	11	33	21		18.8
Impulsive	F	G	H	I	J	K	Mean
Identical	78	84	67	81	84	84.2	79.7
Indeterminate	0	0	0	0	0	0	0
Different	22	16	33	19	16	15.8	20.3

TABLE 9

PERCENTS OF CORRECTION OF MISCUES WHICH DID NOT RETAIN THE GRAMMATICAL FUNCTION FOR REFLECTIVE AND IMPULSIVE GROUPS*

	A	B	C	D	E		Mean
Reflective	50	50	0	33.3	75		41.66
	F	G	H	I	J	K	Mean
Impulsive	40	0	0	33.3	66.7	33.3	28.9

*Given in percentage.

TABLE 10

CORRECTION RATES FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E	Mean
Successful	16	24	8	12	32	18.4
Attempted	4	0	4	4	0	2.4
Unsuccessful	80	76	88	84	68	79.2

Impulsive	F	G	H	I	J	K	Mean
Successful	12	24	0	16	12	4	11.3
Attempted	0	0	0	4	4	4	2
Unsuccessful	88	76	0	80	84	92	70

*Given in percentage.

When students attempted to correct miscues, they were successful most of the time. However, their attempts to correct names were often unsuccessful. After a few attempts, many students settled on an incorrect response and used that for the remainder of the selection.

OR: Steven
ER: Sven

OR: Caribe
ER: Claribel

To provide a broader view of correction strategies, the percent of correction for the entire reading selection has been calculated. Table 11 shows the percent of successful correction for the entire selection.

The range in scores is similar for the two groups but slightly lower for I students.

While there are quantitative differences, there appear to be few qualitative differences in correction strategies between reflectives and impulsives. Considering only corrected miscues, reflectives corrected a higher percentage of miscues which involved a minimal change of meaning. Table 12 shows the percent of corrected miscues which involved extensive, minimal, and no meaning change.

Again considering only corrected miscues, the highest percent was fully acceptable grammatically for reflectives, while for impulsives the rate of correction of grammatically acceptable and unacceptable miscues was the same. Table 13 shows the percent of corrected miscues which were fully acceptable, partially acceptable, and unacceptable

TABLE 11

CORRECTION RATES FOR THE ENTIRE SELECTION*

Reflective	A	B	C	D	E	Mean
Successful	8.1	21.3	13	12.8	19.4	14.9
Impulsive	**F**	**G**	**H**	**I**	**J**	**K**	**Mean**
Successful	7	19.4	5.2	17.6	10.4	11	11.8

TABLE 12

PERCENT OF CORRECTED MISCUES ACCORDING TO MEANING CHANGE FOR REFLECTIVE AND IMPULSIVE GROUPS

	Extensive	Minimal	None
Reflective	68.1	27.2	4.5
Impulsive	81.25	6.25	12.50

TABLE 13

PERCENT OF CORRECTED MISCUES ACCORDING TO GRAMMATICAL ACCEPTABILITY FOR REFLECTIVE AND IMPULSIVE GROUPS

	Acceptable	Partially acceptable	Unacceptable
Reflective	54.5	27.3	18.1
Impulsive	43.75	12.50	43.75

*Given in percentage.

grammatically.

As will be discussed, grammatical acceptability and semantic acceptability are closely related. All of the corrected miscues which were grammatically acceptable were either fully or partially acceptable semantically.

OR: Claribel always got noisy when we did her.

ER: Claribel always got noisy when we hid her.

The substitution of "did" for "hid" is fully acceptable grammatically but only partially acceptable semantically in relation to the text.

Grammatical acceptability. Table 14 shows the percent of miscues which were fully acceptable, partially acceptable, and unacceptable grammatically.

The range of fully acceptable miscues is again wider for I students than for R students, though the difference is not great.

Table 15 shows the percent of miscues which are grammatically acceptable with part or all of the sentence. In this case the range of grammatically acceptable miscues is wider for R students than for I students. The mean scores for each group are again very similar.

Miscues were often grammatically and semantically acceptable.

OR: . . . until Sven Olsen discovered he wanted one.

ER: . . . until Sven Olsen decided he wanted one.

OR: None of us ever figured out why he changed the pet he had.

TABLE 14

GRAMMATICAL ACCEPTABILITY FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E		Mean
Acceptable	80	68	60	56	76		68
Partially acceptable	16	16	12	12	16		14.4
Unacceptable	4	16	28	32	8		17.6
Impulsive	F	G	H	I	J	K	Mean
Acceptable	60	80	52	68	80	64	67.3
Partially acceptable	16	8	24	12	8	20	14.7
Unacceptable	24	12	24	20	12	16	18

TABLE 15

PARTIALLY AND FULLY GRAMMATICALLY ACCEPTABLE MISCUES FOR REFLECTIVE AND IMPULSIVE GROUPS*

	A	B	C	D	E		Mean
Reflective	96	84	72	68	92		82.4
	F	G	H	I	J	K	Mean
Impulsive	76	88	76	80	88	84	82

*Given in percentage.

ER: None of us ever figured out why he chose the pet he did.

Semantic acceptability.--The organization of words into grammatical structures is the basis for conveying meaning. Semantic acceptability is dependent on and limited by grammatical acceptability. In a Goodman analysis, a judgment is made for grammatical acceptability first and then semantic acceptability. Semantic acceptability is never marked higher than grammatical acceptability. Table 16 shows the percent of miscues which were fully acceptable, partially acceptable, and unacceptable semantically. The range is broader and lower for I students than for R students.

Comparing the two groups, only one I student attained a higher percent of acceptable miscues than the lowest percent of any R student.

At times one semantically acceptable miscue triggered another within the sentence as the reader tried to retain the meaning.

OR: All of the stations were on duty for twelve hours at that time.

ER: All of us at the station were on duty for twelve hours at a time.

Considering all miscues with any degree of semantic acceptability, the range is still wider for I students. Table 17 shows the combined percents of fully and partially semantically acceptable miscues.

Meaning change.--The percent of miscues which cause

TABLE 16

SEMANTIC ACCEPTABILITY FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E		Mean
Acceptable	68	52	36	36	36		45.6
Partially acceptable	24	16	16	24	36		23.2
Unacceptable	8	32	48	40	28		31.2
Impulsive	F	G	H	I	J	K	Mean
Acceptable	16	60	12	32	32	24	29.3
Partially acceptable	24	28	12	20	28	24	22.7
Unacceptable	60	12	76	48	40	52	48

TABLE 17

FULLY AND PARTIALLY SEMANTICALLY ACCEPTABLE MISCUES FOR REFLECTIVE AND IMPULSIVE GROUPS*

	A	B	C	D	E		Mean
Reflective	92	68	52	60	72		68.8
	F	G	H	I	J	K	Mean
Impulsive	40	88	24	52	60	48	52

*Given in percentage.

no meaning change, minimal change, and extensive change before correction are presented in Table 18. In this case, the range is broader for R students than for I students.

When the miscues which cause no change and those which cause minimal change are combined, the two groups appear to be farther apart. Table 19 shows the percent of miscues which caused no change and minimal change of meaning.

The range of scores is broader and lower for I students than for R students. Considering the mean scores, R students appear to be more successful at retaining some meaning in their miscues. It should be noted that a miscue may be fully or partially acceptable semantically yet cause extensive meaning change.

OR: Instead, there was a loving song.

ER: Instead, there was a lovely song.

OR: Her wings were folded quickly at her sides.

ER: Her wings were folded quietly at her sides.

In both cases the miscue has a degree of semantic acceptability yet causes extensive meaning change.

RMI Interrelationships

Comprehension pattern.--Comprehension is evaluated by interrelating the coding for three categories: Correction, semantic acceptability, and meaning change. There are 27 possible patterns produced by interrelating these three categories. The patterns indicate whether the

TABLE 18

MEANING CHANGE FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E		Mean
No change	48	36	24	8	32		29.6
Minimal	32	28	24	32	8		24.8
Extensive	20	36	52	60	60		45.6
Impulsive	**F**	**G**	**H**	**I**	**J**	**K**	**Mean**
No change	8	40	12	20	24	16	20
Minimal	0	16	4	12	8	8	8
Extensive	92	44	84	68	68	76	72

TABLE 19

MINIMAL AND NO MEANING CHANGE FOR REFLECTIVE AND IMPULSIVE GROUPS*

	A	B	C	D	E		Mean
Reflective	80	64	48	40	40		54.4
	F	G	H	I	J	K	Mean
Impulsive	8	56	16	32	32	24	28

*Given in percentage.

miscues have resulted in no loss, partial loss, or loss of comprehension.

Table 20 indicates the percent of miscues which caused no loss, partial loss, and loss of comprehension.

The range of scores indicating no loss of comprehension for I students is similar to the range for R students. It is interesting to note that no student retained the meaning in more than 60% of his miscues. Comparing miscues which caused a loss of comprehension the range is broader and greater for I students than for R students.

Grammatical relationships pattern.--The grammatical relationships pattern is derived by interrelating the three questions pertaining to correction, grammatical acceptability, and semantic acceptability. Table 21 shows the percent of miscues which show strength, partial strength, weakness, and overcorrection in grammatical relationships.

The percent of miscues showing strength is wider and lower in range for I students.

Although all of the percents of overcorrection are small, more of the R students demonstrated some overcorrection of miscues. Only one R student did not overcorrect, while three I students did not do so.

Comprehending

Goodman (1973) uses the comprehending score as a measure of comprehension. As stated earlier, comprehending is a measure of the percent of fully semantically acceptable

TABLE 20

COMPREHENSION PATTERN FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E		Mean
No loss	60	60	28	16	60		44.8
Partial loss	24	8	16	36	16		20
Loss	16	32	56	48	24		35.2
Impulsive	**F**	**G**	**H**	**I**	**J**	**K**	**Mean**
No loss	16	60	12	32	36	16	28.7
Partial loss	4	12	4	16	8	16	10
Loss	80	28	84	52	56	68	61.3

*Given in percentage.

TABLE 21

GRAMMATICAL RELATIONSHIPS PATTERN FOR REFLECTIVE AND IMPULSIVE GROUPS*

Reflective	A	B	C	D	E	Mean
Strength	68	48	40	48	52	51.2
Partial strength	8	12	24	16	32	18.4
Weakness	16	24	32	36	8	23.2
Overcorrection	8	16	4	0	8	7.2

Impulsive	F	G	H	I	J	K	Mean
Strength	28	56	12	36	40	28	33.3
Partial strength	40	16	40	32	48	40	36
Weakness	32	12	48	24	8	32	26
Overcorrection	0	16	0	8	4	0	4.7

*Given in percentage.

miscues plus the percent not semantically acceptable but corrected. Table 22 shows the comprehending scores.

Retelling Score

In addition to the comprehension pattern and comprehending, comprehension is evaluated based on the retelling score. The retelling score is obtained by comparing a transcript of the reader's retelling and an outline of the reading material. The information which a reader recalls is assigned to appropriate categories, such as, characters, theme, plot, and events. Points are withheld for items or aspects not included in the retelling. The outline used in this study is the sample outline for "Space Pet" which is presented in the RMI Manual. Use of this outline rather than an experimenter designed outline will hopefully provide a reference point for possible comparison with other studies.

Table 23 shows the retelling scores. Note that for both groups the mean is lowered by extreme scores.

Considering qualitative differences, students showed particular weakness in the identification of the theme and plot. Only one student was able to even approximate the theme and his answer was only partially correct. Students had only slightly more success describing the plot. Most students identified what happened to the canary but failed to identify the reason the canary fainted or to consider the effect of the problem on the men in the space

TABLE 22

COMPREHENDING FOR REFLECTIVE AND IMPULSIVE GROUPS*

	A	B	C	D	E		Mean
Reflective	76	64	44	48	60		58.4
	F	G	H	I	J	K	Mean
Impulsive	28	68	12	40	44	28	36.7

TABLE 23

RETELLING SCORE FOR REFLECTIVE AND IMPULSIVE GROUPS

	A	B	C	D	E		Mean
Reflective	21.5	38.5	23	1	16.5		20.1
	F	G	H	I	J	K	Mean
Impulsive	5	26	6	28.5	28.5	17.5	18.6

*Given in percentage.

station. The students were somewhat more accurate in their recall of the characters and events. Most readers' responses were solely at the factual level. They seemed to be unable to take an overview of the story.

Contrasting R and I students, R students recalled more specific details and events from the story. Table 24 shows the points each student received in the category entitled "Events."

On the other hand, I students appeared to be somewhat more effective at identifying the plot. Table 25 shows the scores in the category entitled "Plot."

Miscues which were not graphically similar were grammatically acceptable in most cases, specifically 69.5%. They were semantically acceptable less frequently, 47.8% of the time. The reader's sense of structure was greater than his sense of meaning. When readers departed from graphic cues, they used structural screens more often than semantic screens.

OR: . . . with claws sticking up from the air.

ER: . . . with claws sticking up in the air.

The substitution of "from" is grammatically acceptable but only partially semantically acceptable. Table 26 shows the relationship between miscues which were not graphically similar and grammatical and semantic acceptability. R students made more miscues which were not graphically similar. These miscues did not differ qualitatively from those of impulsives in regard to grammatical and semantic

TABLE 24

RETELLING EVENTS FOR REFLECTIVE AND IMPULSIVE GROUPS

	A	B	C	D	E		Mean
Reflective	6.5	19.5	12.5	1	4.5		8.8
	F	G	H	I	J	K	
Impulsive	2	4	1	11.5	5.5	4.5	4.8

TABLE 25

RETELLING PLOT FOR REFLECTIVE AND IMPULSIVE GROUPS

	A	B	C	D	E		Mean
Reflective	10	10	5	0	5		6
	F	G	H	I	J	K	Mean
Impulsive	0	15	5	10	15	10	9.2

TABLE 26

GRAMMATICAL AND SEMANTIC ACCEPTABILITY
OF UNGRAPHICALLY AND SIMILAR MISCUES*

	Grammatical acceptability	Semantic acceptability
Reflective	69.2	46.2
Impulsive	70	50

*Given in percentage.

acceptability.

Weber (1970) suggests that one of the most difficult tasks for the first-grade reader may be achieving a balance between graphic information and structural constraints. Comparing high graphic acceptability means for each student with grammatic acceptability means indicates larger differences between the two for I students than for R students. Table 27 shows the difference between the graphic acceptability mean and the grammatical acceptability mean for each student. R students achieved a better balance between graphic acceptability and structural constraints. Failure to use sufficient graphic information may affect other cueing systems. Four of the six I students had lower graphic acceptability means than grammatical acceptability means. Only one R student had a lower graphic acceptability mean and the difference between means was slight. Goodman (1973) reports that for fourth-grade students there is a positive correlation between graphic proximity and comprehending. The failure of I students to use sufficient graphic information may be related to their lower comprehending scores.

Looking at correction strategies offers insight into the reader's use of cueing systems. R students made 16 miscues which were totally unacceptable grammatically and semantically and corrected five or 31.3%. I students made 26 unacceptable miscues and corrected seven or 26.9%. This finding appears to contradict Goodman and Burke's

TABLE 27

GRAPHIC ACCEPTABILITY MEANS VERSUS
GRAMMATICAL ACCEPTABILITY MEANS

	6-S	18-H	21-H	20-H	19-H	22-H	Mean
Reflective	2	-3	3	10	3	3	4
	18-S	10-S	8-S	5-H	4-W	11-H	Mean
Impulsive	-8	-38	36	19.5	-12	-6.1	20

finding that readers seldom corrected miscues which were totally unacceptable grammatically and semantically. The rates of correction for unacceptable miscues was higher for these readers than the rate of correction for all types of miscues. The mean rate of correction for these miscues is 30.4% compared to the rate of 12% for all miscues.

Some Statistical Comparisons

A second goal of this study was to determine whether R students differ from I students in relation to a number of key variables. In order to statistically test whether the two groups differ, a Mann-Whitney U test has been used. A nonparametric test has been used because of the small size of the group studied and because the group was not normally distributed. The Mann-Whitney is a rank test which is useful for determining whether or not two independent groups come from parent populations having the same distributions. The testing for equality of the populations considers all ordinal positions of the two groups.

A rank of one was assigned to the lowest algebraic value, a rank of two to the second lowest value, and so on.

The proposals of this study have been written in the form of null hypotheses. If one of the obtained U values is lower than the critical value of U then the null hypothesis may be rejected and the two groups differ. The critical value of U for a two-tailed test at the .05 level of significance is 3. The critical value of U at the .1 level is 5. Table 28 shows the U values for selected comprehension and grammatical relationships.

The reflective and impulsive groups differ significantly in response time and errors on the MFF. There is no overlap in response time or error scores and the two groups are distinct. The two groups do not differ significantly at the .05 level with regard to comprehension as measured by a standardized test. They do, however, differ at the .1 level of confidence.

The oral reading of the two groups does not differ significantly in relation to comprehension pattern. The groups differ in grammatical relationships at the .1 level but not at the .05 level of confidence.

As stated earlier, comprehension pattern is a process measure formed by interrelating the ratings in the categories of correction, semantic acceptability, and meaning change. Since semantic acceptability is identified by Goodman (1973) as the best indicator of reading proficiency, semantic acceptability has been considered separately. The

TABLE 28

U VALUES FOR SELECTED COMPREHENSION AND GRAMMATICAL RELATIONSHIPS

	U value	Significance
Response time	0	.05
Errors	0	.05
Comprehension*	4	.1
Comprehension pattern (no loss)	8.5	N.S.
Semantic acceptability	4	.1
Comprehending	5	N.S.
Grammatical relationships (strength)	4.5	.1

*Grade level on California Achievement Test.

U value of 4 for semantic acceptability approaches significance at the .05 level, however, it is at the .1 level of confidence. A disposition toward reflection or impulsivity appears to affect the production of semantically acceptable miscues. R students made more fully semantically acceptable miscues than I students and the difference between the two groups approaches statistical significance.

In order to further examine the differences in semantic acceptability, comprehending has been measured. Comprehending is a measure of the percent of fully semantically acceptable miscues plus the percent not semantically acceptable but corrected. The two groups do not differ significantly in comprehending. When correction of miscues is considered, the two groups differ less than when correction is not considered.

Summary of Findings

In all areas, the scores of R and I students overlapped. The ranges of scores were wider for impulsive readers in the areas of MPHW, sound similarity, semantic acceptability, comprehending, comprehension pattern, and grammatical relationships pattern. The range of scores was wider for reflective readers in the areas of grammatical function, grammatical acceptability, and meaning change. The two groups had similar spans in the areas of graphic similarity and correction.

Every reader generated miscues. The number of

miscues ranged from 31 to 200. When students attempted correction of their miscues, they were successful most of the time.

For these readers, few intonation miscues were found to seriously disrupt meaning or to change the grammatical structure. Intonation miscues occurred most often at the end of the sentence when the reader failed to pause and read on into the next sentence pausing after the first few words. When this happened, the meaning and grammatical structure of one or both sentences was affected.

Dialect involved miscues seldom occurred. Only one student made many dialect related miscues. These all involved verb tense.

A high percentage of most students' miscues were graphically similar to some degree to the text; percents ranged from 80 to 100. R and I students differed little in the production of graphically similar miscues.

Graphic similarity means were higher for each student than sound similarity means, though the difference was never large. R students had higher graphic similarity means, 71.1, compared to 65.9 for I students. Figure 1 shows the interaction of the grapho-phonemic cueing systems.

There was little difference in mean scores for high sound similarity, 57.6% for reflectives and 54.9% for impulsives. The combined percents of miscues showing high and parital sound similarity indicate that a high percentage

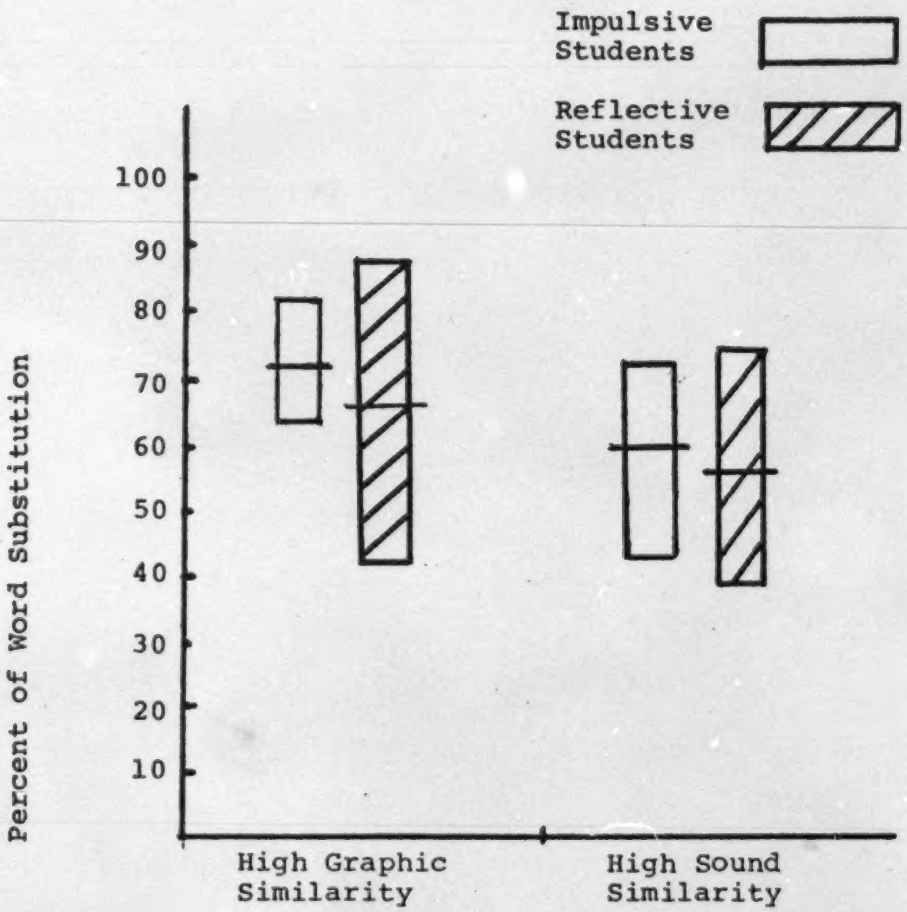

Figure 1. Performance level: Grapho-phonemic cueing system. Each bar shows range and mean; N = 12.

of miscues involve some sound similarity, 83.6% for reflectives and 82.4% for impulsives.

Students retained the grammatical function in two-thirds or more of their miscues. The mean score for R students was only slightly higher than that for I students, 81.2% compared to 79.7%.

The highest percent of correction for any student was 32%. This finding supports Goodman's (1973) finding that no group corrects more than 38% of its miscues. The mean score for R students is 18.4% which is higher than the score for I students, 11.3%. This is true if only the first 25 miscues are considered. There is less difference between the mean scores if the percents of correction for the entire selection are considered, 14.9% for reflectives compared to 11.8% for impulsives.

Correction rates varied depending upon the degree of grammatical acceptability, semantic acceptability, and meaning change. Those miscues which were corrected were most often fully acceptable grammatically and either fully or partially acceptable semantically. The majority of corrected miscues for both groups involved extensive meaning change.

All readers showed a strong sense of grammatical structure. Miscues were fully grammatically acceptable at least 50% of the time for all students. There was little difference in mean scores, 68% for R students and 67.3% for I students. For both groups miscues were grammatically

acceptable to some degree at least 68% of the time. The mean scores for fully and partially acceptable measures were almost identical, 82.7% versus 82%.

Means for semantic acceptability were below means for grammatical acceptability, Considering the differences for individuals in each group, the mean difference was 22 points for R students and 37 points for I students. Readers were less able to control meaning than structure. Figure 2 shows the interaction of the grammatical and semantic cueing systems.

R students had higher mean scores for fully semantically acceptable miscues, 45.6 compared to 29.3 for I students. Combining fully and partially semantically acceptable miscues, the mean score for R students, 68.8%, again exceeds the score for I students, 52%. The difference between the mean scores for the two groups is approximately the same in both instances.

In the category of meaning change, the performance of the two groups was similar, although the mean score indicating no meaning change for reflectives was higher, 29.6, compared to 20. The difference between mean scores for the two groups is greater when miscues causing no meaning change and those causing parital change are combined, 54.4 for reflectives and 28% for impulsives. Using the comprehension pattern as an index, no student retained the meaning of the text in more than 60% of his miscues. The mean score for R students, 44.8, is higher than that for

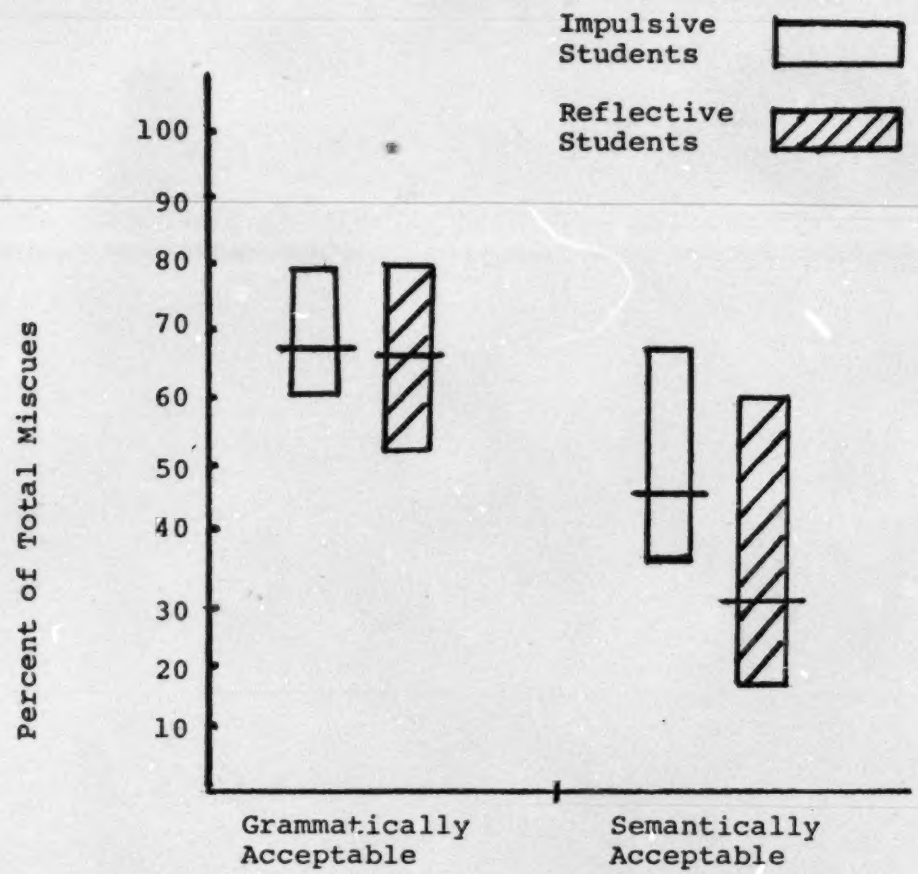

Figure 2. Performance levels: Syntactic and semantic cueing systems. Each bar shows range and mean; N = 12.

I students, 28.7. R students more often retained a degree of meaning in their miscues.

Readers in both groups had a stronger sense of grammatical relationships than of meaning. Mean scores indicating strength in grammatical relationships were 51.2 for R students and 33.3 for I students. More of the R students overcorrected miscues than I students. All readers showed some control of grammatical relationships in at least half of their miscues.

All retelling scores were low. Reflectives had higher mean scores than impulsives, 20.1 compared to 18.6.

Another measure of comprehension in a Goodman analysis is the comprehending measure. While the scores of the two groups overlapped, the reflective group had a higher mean score than the impulsive group, 58.4 compared to 36.7.

Using a Mann-Whitney U Test, the reflective group differs statistically from the impulsive group in response time and errors. No significant differences were found between the two groups at the .05 level in regard to comprehension, comprehension pattern, semantic acceptability, comprehending, or grammatical relationships. However, the results for semantic acceptability and grammatical relationships approach significance at this level and are at the .1 level of confidence. Also, the two groups differed at the .1 level of confidence in comprehension as measured by a standardized test.

CHAPTER V

SUMMARY, CONCLUSIONS, AND DISCUSSION

Summary

The purpose of this study was to investigate the relationship between R-I and oral reading. The RMI was used to classify and evaluate the oral reading miscues of a group of fourth-grade boys. The boys were judged reflective or impulsive based on response time on the Matching Familiar Figures Test by Jerome Kagan. Two main null hypotheses were tested. They are: A disposition toward reflection or impulsivity does not affect oral reading miscues, and a disposition toward reflection or impulsivity does not affect reading comprehension.

Conclusions

Considering first a statistical analysis of differences, reflective readers did not differ significantly from impulsive readers on the reading dimensions measured: Comprehension, comprehension pattern, semantic acceptability, comprehending, and grammatical relationships. However, the results approach statistical significance for comprehension, semantic acceptability, and grammatical relationships. In contrast, Butler (1972) found no significant differences

between groups in the percent of miscues semantically acceptable. There were, however, differences in research design which make this study and Butler's not completely comparable. The results were not significant for comprehension pattern and comprehending. The lack of significant differences in these areas may be due to the fact that correction is a factor in both these instances. Although the semantic acceptability of their miscues is less, the impulsives' comprehension pattern and comprehending scores are comparable to those of reflectives due to the factor of correction.

The most consistent findings were that the scores of impulsive readers in most areas were lower and wider in range. This supports Butler's (1972) and Goodman's (1973) findings that there was wide variation within each group on each dependent variable and the ranges tended to overlap. The broad ranges of their scores may indicate that impulsive readers have less staying power than reflective readers. Whether their performance would vary widely from one testing to another requires further investigation.

Considering mean scores, there was a notable lack of difference between the two groups in the areas of graphic similarity, sound similarity, grammatical function, correction, and grammatical acceptability. On the other hand, there was a difference of 15 or more points in the mean scores in the areas of semantic acceptability, meaning change, comprehension pattern, comprehending, and

grammatical relationships pattern with the reflective group having the higher scores. Thus, there was a trend toward differences between the two groups on the higher level reading skills but not on the lower level skills.

All readers used the three cueing systems: Grapho-phonemic, syntactic, and semantic with some success. The interaction of these cueing systems varied. Readers relied on graphic similarity more than sound similarity and grammatical acceptability more than semantic acceptability. This finding supports the findings of Goodman and Burke (1969) and Goodman (1973). The miscues of all readers indicated that they expected meaningful language as they read. They were, however, often unable to provide meaningful responses.

The impulsive group made more miscues than the reflective group. This finding may be interpreted as supporting Kagan's (1965c) finding that the impulsive group has the highest reading error scores reading single words or a prose selection. However, using the Mann-Whitney Test, the two groups are not statistically different in MPHW. This supports Butler's finding that there was no significant difference between the reflective and impulsive group in the number of miscues.

Intonation miscues were not a major factor for these readers. They occurred primarily at pivotal points in the sentence causing such errors as run-on sentences and sentence fragments. Dialect involved miscues were a factor

for only one reader in this study.

Both reflective and impulsive readers used graphic and phonemic cues effectively. For all students, more than half of their miscues involved graphic and sound similarity.

All students retained the grammatical function in most of their miscues. The difference between R and I students was primarily in the rate of correction of miscues which did not retain the grammatical function. Reflective readers appear to have a better sense of structural anomaly. They use grammatical screens effectively to signal the need for correction of a miscue. One effect of the successful use of grammatical screens is that many miscues which would cause extensive meaning change are corrected.

One area of difference between reflective and impulsive readers is correction. Reflectives corrected a higher percentage of their miscues in the beginning of the selection compared to the percent of correction for the entire selection. It seems that they tired as they read and used their screens for correction less efficiently. I students slightly increased their rate of correction as they read, perhaps because they gained support from the context. Another possibility is that the increased rate of correction is due to anxiety generated by their greater number of mistakes. Messer (1970a) offers support for this possibility.

The difference between the rate of correction for the two groups is small. This finding does not support

Butler's finding that R students corrected a significantly larger percentage of miscues. The highest percent of correction for any student studied was 32%. This finding supports Goodman's (1973) finding that no group corrects more than 38% of its miscues. As Goodman and Burke (1968) found, when students attempted to correct a miscue, they were successful most of the time.

The most frequently used screen triggering correction seems to be meaning change. Thirty of the 41 corrected miscues or 73% involved extensive meaning change. Readers seldom corrected miscues which were fully grammatically and semantically acceptable and caused no meaning change. This appears to indicate that readers seldom based correction on grapho-phonemic cues.

R students tended to have a greater concern for accuracy. Support for this contention is found in their slightly higher rate of correction, greater correction of miscues which involved a minimal change of meaning, and greater involvement in overcorrection.

Supporting the findings of Clay (1968), Weber (1970), and Goodman (1973), all readers showed a strong control of grammatical structure. Miscues were grammatically acceptable with part or all of the sentence at least 68% of the time. Considering the grammatical relationships pattern, all readers showed some control of grammatical relationships in half or more of their miscues. The differences between the two groups are not large; however,

reflectives produced more miscues indicating strength. Readers were considerably less successful at controlling meaning. Using semantic acceptability as a criterion, impulsive readers lost more of the potential meaning. As noted earlier, Goodman (1973) found that the percent of miscues semantically acceptable before correction was the best indicator of reading proficiency. Accordingly, it may be concluded that reflective readers read the selection more proficiently. Considering meaning change, reflective readers more often retained some meaning in their miscues. The interrelationship of correction, semantic acceptability, and meaning change forming the comprehension pattern also indicates that R students were more successful in retaining the meaning of the text than I students.

All readers had some difficulty retelling the story. Their recall of details was often sketchy. Few students could identify the theme correctly or even summarize the plot. It appears that the task of reading orally interfered with these readers' ability to perceive the overall meaning of the selection.

I students as a group did not always differ greatly from R students. Yet there was a tendency for individual I students to score lower than any R student. The finding of Y. Goodman (1971) seems pertinent to the results of this study. She found that average and slow readers did not differ greatly in the use of strategies but in the readers' ability to use strategies effectively. Goodman (1973)

reached similar conclusions. In this study, impulsive readers appear to use strategies less effectively than reflective readers. They used all strategies with some degree of success. But in general, they used less graphic, phonemic, structural, and semantic information. The differences while not statistically significant were greatest in the area of comprehension. It seems possible that the tendency to respond quickly without adequate hypothesis testing results in impulsives using less contextual information than they need. Hence, they make more miscues which do not preserve the meaning of the selection. This possibility requires further testing.

In sum, there were trends toward significant differences between the reflective and impulsive groups, particularly in the area of comprehension. There was considerable overlap between the groups in all areas. There was a tendency for R students to use more graphic, phonemic, grammatical, and semantic information and to use it more effectively. In their study of high proficiency and low proficiency readers, Goodman (1973) reached a different conclusion for the group using more information. He reports that low proficiency readers used more graphic, syntactic, and semantic information than they needed and lost more of the potential meaning.

Discussion

Regarding the difference in the range of scores between the reflective and impulsive groups, Goodman's

(1973) finding seems pertinent. He found that the range of scores was narrowest for all high groups and widest for low groups. It appears that these I students performed similarly to low groups. The wide range of their performance may be related to less consistent performance due to the tendency to respond without considering alternative hypotheses. They may perform well or poorly depending upon the accuracy of their fast responses.

There were surprisingly few differences between the reflective and impulsive groups. There are two areas, however, in which there was a trend toward differences between the two groups. They are correction and comprehension. There are two plausible explanations for these differences.

R-I is by definition related to time. Time is not necessarily a factor in reading. In fact, time was not a critical factor to reading the selection which students read orally. Students were permitted to read the selection at whatever speed they chose. By extension of this reasoning, time was not critical to the student's relative use of most cueing systems, the exception being correction. Correction is time-related in that when a student corrects a response, he must take the time to scan the visual stimuli again and form a new hypothesis. The higher correction rates of R students may reflect the fact that they were more willing to take the time to correct their miscues.

A second area of difference is comprehension, aspects of which were measured in the categories of semantic

acceptability, meaning change, comprehension pattern, comprehending, and retelling. There were notably few differences between the two groups in the use of graphic, phonemic, and grammatical cueing systems. The lack of differences in these systems and the differences in comprehension may be related to developmental factors. Most of these students appear to have mastered the lower level reading skills. They are using graphic, phonemic, and grammatical information effectively. Comprehension is a higher level skill which is mastered at a later stage of development. Students in the reflective group tended to comprehend more than students in the impulsive group. For these fourth grade students, response uncertainty appears to be a greater factor in the area of comprehension than it is in the areas of graphic, phonemic, and grammatical skills.

Suggestions for Further Research

The trends identified in this study indicate a need for further investigation of the relationship between R-I and oral reading. The broad range of performance of I students leads one to question whether an individual I student's oral reading would vary significantly from one reading sample to another.

The lack of clear-cut differences between the reflective and impulsive group may be related to the age and grade of the students studied. There are indications that the disposition toward R-I becomes less of a factor

as students grow older and become more proficient in reading (Denney, 1974; Lesiak, 1970). Students learn to modify their conceptual tempo to meet the requirements of specific situations. Training masks out their true response style. Also, as students become more proficient readers, reading involves less response uncertainty. A longitudial study of R and I students beginning in the first grade might yield information about the long term relationship between cognitive tempo and reading.

Further investigation should explore these questions:

How does an impulsive disposition affect the reading of short discrete units of information such as directions or questions on a test?

Can I students be trained to scan visual stimuli and eliminate incorrect alternatives? Will visual discrimination training generalize to the reading situation?

Can I students be trained to use correction strategies more effectively and frequently?

Will I students who are trained to read more slowly make fewer miscues?

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APPENDIX A

READING SELECTION "SPACE PET"

SPACE PET

As far as I know there has never been a rule against pets in a space station. We had just never had any pets until Sven Olsen decided he wanted one. None of us ever figured out why he chose the pet he did.

I first saw Claribel when I was working in my office. I heard a musical whistle near my ear and thought it had come over the radio. I waited for the news to follow. Instead, there was a lovely song. I looked up and had my first view of Claribel.

She was a small yellow canary, hanging very still in the air. Her wings were folded quietly at her sides. She could stay that way because nothing has any weight in space. Before I recovered from the surprise of seeing a canary in our space station, she did a kind of backward loop. No earthbound canary could have done it.

In no time at all, Sven's pet was everybody's pet. We had a little trouble hiding her when important guests came to visit the space station. We couldn't be sure if we were breaking any rule having her there. But we liked her too much to take a chance on losing her.

Claribel always got noisy when we hid her. Sometimes we had to think fast to explain the peeps and whistles that came from the oddest places. There were a few narrow escapes, but then who would ever dream of looking for a canary in a space station?

All of us at the station were on duty for twelve hours at a time. This was not as hard as it sounds, since you need little sleep in space. Of course there is no "day" and "night" when you are always floating in sunlight. But we found it easier to think of time as being divided into day and night.

One "morning" when I woke up, I could scarcely drag myself out of bed. I was still only half awake when I joined the other men at breakfast. I noticed they seemed unusually sleepy, too. Then I saw that one seat at the table was empty.

"Where's Sven?" I asked.

"He's looking for Claribel," someone answered. "He can't find her. She usually wakes him up."

Just then Sven appeared at the door. In his hand lay a tiny bunch of yellow feathers, with claws sticking up in the air.

"What happened?" we asked.

"I don't know," said Sven sadly. "I just found her like this."

"Let's have a look at her," said Jock Duncan, our cook and doctor. We waited in silence while he held Claribel against his ear, trying to hear a heartbeat.

Presently he shook his head. "I can't hear her heart. But that does not prove she's dead. Let's try giving Claribel some oxygen."

Claribel was put into a face mask. It was as large

as an oxygen tent for her. To our delighted surprise, she came back to life at once. Beaming broadly, Sven removed the mask and she hopped onto his finger. She sang her song, then fell over again in his hand.

"I don't understand what's wrong with her," said Sven. "She's never done this before."

For the last few minutes I had been trying to remember something. My mind seemed to be working very slowly, as if I were still sleepy.

Suddenly I understood. "There's something wrong with the air!" I yelled. "That's why Claribel passed out. I just remembered that coal miners often take canaries down into mines to warn the men when the air is bad."

"Oh no!" said Jim, our engineer. "The alarm would have gone off. We have two good warning systems."

"The second alarm isn't connected yet," another man reminded him. That really upset Jim. He left without a word. The rest of us passed around the oxygen bottle like an Indian peace pipe. We gave Claribel more oxygen, and she came back to life.

Ten minutes later Jim came back and explained what had happened. During the night, part of an air line had frozen and the alarm had failed to go off. Half a million dollars worth of engineering instruments had let us down. Without Claribel, all of us might have died.

Today, if you should visit a space station, don't be surprised if you hear a canary singing. It means you

have a double safeguard at the cost of some birdseed.

APPENDIX B

RETELLING OUTLINE

"SPACE PET"

Character Analysis

Recall	15	Development	15
Author		likes pets	
Sven Olsen		likes pets	
Claribel		sings	
		small, yellow canary	
Jock Duncan		noisy	
Jim		cook and doctor	
Another man		engineer	

Theme 20

Machines no matter how complex and expensive they are, have their limitations.

Plot 20

What causes Claribel, the canary to faint? How does this affect the men on the space station?

Events 30

Author heard and saw Claribel for the first time when she sang while he was working in his office in the space station.

Claribel the canary is owned by Sven Olsen but becomes everybody's pet. They hide her when guests come because they think there may be rules against canaries in space.

Men come to breakfast and seem sleepy. Author is listless.

Sven can't find Claribel and when he does find her she has passed out.

Jock examines her and she appears dead. Claribel is given oxygen, comes to but passes out again.

Author suggests there's something wrong with the air.

Jim checks out the two warning systems.

Everyone takes oxygen.

Jim returns and explains that an air line had

frozen and the alarm didn't go off. The second alarm had not been connected.

Claribel saved them all.

Additional Information

The story is told by the author who was a member of an orbiting space station.

The men in the space station are on duty for twelve hours since they need little sleep in space. They are always floating in sunshine but think of the time as being divided into day and night.

Coal miners often take canaries down into mines to warn men when the air is bad.

APPENDIX C

SAMPLE RMI CODING SHEET

Miscue Number	Reader Text		DIALECT 1	INTONATION 2	GRAPHIC SIMILARITY 3			SOUND SIMILARITY 4			GRAMMATICAL FUNCTION 5			CORRECTION 6	GRAMMATICAL ACCEPTABILITY 7	SEMANTIC ACCEPTABILITY 8	MEANING CHANGE 9	COMPREHENSION			GRAMMATICAL RELATIONSHIPS			
					Y	P	N	Y	P	N	Y	P	N					No Loss	Partial Loss	Loss	Strength	Partial Strength	Weakness	Overcorrection
1- 104	Seven	Sven			✓			✓			✓			N	Y	Y	N	✓			✓			
2- 105	Ahslen	Olsen			✓			✓	✓		✓			N	Y	Y	N	✓			✓			✓
3- 106	even	ever			✓			✓			✓			N	Y	Y	N	✓			✓			
4- 108	Charblin	Claribel				✓			✓		✓			N	Y	Y	N	✓	✓					
5- 110	in	near					✓			✓	✓			N	Y	Y	N	✓						
6- 110	I	–			—			—			—			N	Y	Y	N	✓						
7- 111	to	–			—			—			—			N	Y	Y	N	✓						
8- 115	a	–			—			—			—			N	Y	Y	N	✓						
9- 115	Charibu	Claribel				✓			✓		✓			N	Y	Y	N	✓		✓			✓	
10-204	I	In			✓			✓		✓	✓			N	Y	Y	N	✓			✓			
11-204	Steven's	Sven's			✓			✓		✓	✓			N	Y	Y	N	✓			✓			
12-211	have	take					✓			✓	✓			N	Y	Y	N	✓				✓		
13-217	oldest	oddest			✓			✓			✓			N	Y	Y	N	✓			✓			
14-218	they	then			✓			✓	✓		✓			N	Y	Y	N	✓			✓			
15-307	what	that			✓			✓			✓		✓	N	Y	Y	N	✓			✓			
16-310	Claribull	Claribel			✓			✓			✓			N	Y	Y	N	✓			✓			
17-311	some	someone			✓			✓			✓			N	Y	Y	N	✓			✓			
18-315	with	In					✓			✓	✓			N	Y	Y	N	✓				✓		
19-315	in	–			—			—			—			N	Y	Y	N	✓				✓		
20-315	tinny	tiny			✓			✓			✓			N	Y	Y	N	✓			✓			
21-317	from	in					✓			✓	✓			N	Y	Y	N	✓				✓		
22-402	—	as			—			—			—			N	Y	Y	P	✓			✓			
23-402	a.	an			✓			✓		✓	✓			N	Y	Y	N	✓				✓		
24-404	delight	delighted			✓			✓			✓		✓	N	Y	Y	P	✓			✓			
25-407	to	onto				✓			✓		✓			Y	Y	P	P	✓			✓			✓
		COLUMN TOTAL	0	0	13	3	4	9	5	6	16	0	4					15	2	8	12	3	6	4
		PERCENTAGE	0	0	65	15	20	45	25	30	80	0	20					60	8	32	48	12	24	16
		QUESTION TOTAL	20		20			20			20							PATTERN TOTAL			25			

COURSE WORK FOR MASTER'S DEGREE IN READING

RUTGERS UNIVERSITY

		Instructor
Fall, 1971		
290:518	Psychology of Personality	Dr. Leon
Fall, 1972		
299:561	Foundations of Reading Instruction	Dr. Kling
Spring, 1973		
299:564	Remedial Reading	Dr. Goldsmith
Fall, 1973		
299:565	Laboratory in Remedial Reading	Dr. Kimberly
Spring, 1974		
610:521	Reading Materials for Children	Dr. Fitzpatrick
Fall, 1974		
290:513	Introduction to Early and Middle Years of Childhood	Dr. Arnold
Spring, 1975		
299:566	Seminar in Reading Research and Supervision	Dr. Kling
Fall, 1975, Spring, 1976		
290:599	Master's Thesis Research	Dr. Kling Dr. Fry
Summer, 1975		
EC630	Effective Teaching Strategies	Dr. Coletta
Summer, 1976		
PSY652	Learning Theories	

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